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VOL. LX

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THREE NEW SPECIES OF *MICROPHOXUS* BARNARD, 1960
(AMPHIPODA, PHOXOCEPHALIDAE, METHARPINIINAE)
FROM THE COAST OF RIO DE JANEIRO, BRAZIL ⁽¹⁾

(With 18 figures)

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The 11 subfamilies included in the amphipod family Phoxocephalidae are well studied in Australia and North America. From South America, however, only nine species are known, five of which are recorded from the coast of São Paulo, Brazil by WAKABARA *et al.* (1991) and VALÉRIO-BERARDO (1992). The genus *Microphoxus* Barnard, 1960 includes the type-species *M. minimus* Barnard, 1960, from Costa Rica, and *M. cornutus* (Schellenberg, 1931) from southern South America (Punta Arenas, Strait of Magellan and Ushuaia) and São Paulo, Brazil. The purpose of this work is to contribute for the knowledge of Amphipod fauna from Rio de Janeiro coast.

MATERIAL AND METHODS

Eighty-eight specimens collected at Arraial do Cabo and Sepetiba Bay, both in the State of Rio de Janeiro, were studied for the present study. The identification followed the original descriptions of BARNARD (1960), BARNARD & DRUMOND (1978), BARNARD (1980), BARNARD & KARAMAN (1991) and JARRETT & BOUSFIELD (1994). The specimens were cleared in 100% lactic acid during 5-30 minutes and stained with Clorazol Black dissolved in alcohol 70°GL. The right side appendices were dissected in glycerin and mounted on microscope slides with Hoyer's liquid or CMC 9. They were illustrated with the aid of a camera lucida mounted on a Zeiss microscope. The material studied was deposited in the Collection of Carcinology, of the Invertebrate Department of Museu Nacional, Rio de Janeiro.

Abbreviation used in this study: Museu Nacional-Rio de Janeiro (MNRJ).

Family Phoxocephalidae Sars, 1895
Genus *Microphoxus* Barnard, 1960

Diagnosis – ventral setae on article 2 of antenna 1 no widely spread, right mandibular incisor with 2-3 teeth and propod of gnathopods least or very setose on anterior margin (amended from Barnard, 1960).

Microphoxus breviramus sp.nov.
(Figs.1-6)

Material examined – Holotype: MNRJ9896-1♀ (6.4mm - dissected and drawing), Praia da Massambaba ao largo da Figueira, Arraial do Cabo, RIO DE JANEIRO, BRAZIL, 23°03'S-42°02'W, Aviso Pesqueiro Suboficial Oliveira and F.C.Fernandes cols., 22/VI/1988, 20m. Paratypes: MNRJ13523-2♂ (6.0mm-1 dissected and drawing) e 1♀ (6.5mm), *ibid.*; MNRJ9882-3♀ (5.8mm; 2.7mm and 2.0mm), *ibid.*, 29/VI/1988.

Diagnosis – Rostrum, not reaching middle of article 2 on antenna 1. Article 4 of antenna 2 with 6 groups of setae on ventral margin. Lacinia mobilis with 4 teeth. Rami of uropods 1-2 smaller than peduncle. Peduncle of uropod 1 without displaced spine; inner ramus with 1 dorsal spine. Peduncle of uropod 2 with marginal spines; inner ramus without dorsal spines. Outer ramus of uropod 3 with 2 long plumose distal setae on article 2. Epimeron 3 with 3 simple facial setae in row. Urosomite 3 with dorsal hook. Telson with 5 long pectinate dorsolateral setae.

Description of female – Head about 19% of total body length (Fig.1A), greatest width about 58% of length in dorsal view (Fig.1B). Rostrum constricted, narrow, slightly elonged, not reaching middle of article 2 on antenna 1 (Fig.1A). Eyes medium, ovate, reddish pigments, rounded ommatidia. Article 1 of peduncle on antenna 1 (Fig.1C) about twice as long as wide, about 1.2 times as wide as article 2, ventral margin with 9 setules, dorsal apex weakly produced with 1 plumose setule. Articles 1-2 of peduncle with similar length, article 2 with 10 long to short bipectinate ventroproximal setae, 3 ventrodistal setules and 1 simple apicodorsal setule, primary flagellum with 13 articles, bearing 5-6 short aesthetasc each on, about 0.6 times as long as peduncle, accessory flagellum with 11 articles, bearing 5-6 short aesthetasc each on. Facial spine formula of article 4 on antenna 2 (Fig.1D) equal 1-3-6-7, medium to short thick spines; dorsal margin with 2 distal setules, notch bearing 1 long pectinate seta and 2 spines, ventral

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spines; dorsal margin with 2 distal setules, notch bearing 1 long pectinate seta and 2 spines, ventral margin with 6 groups of 2-7 long to short pectinate setae, 1 medium ventrodiscal spine, article 5 about 0.8 times as long as article 4 bearing 4 facial spines, dorsal margin smooth with 2 distal setules, ventral margin with 3 sets of 2-4 long to short bipectinate setae, 2 setules, 3 long to medium distal spines placed subfacially and 1 distal setule, flagellum with 15 articles, bearing 3-4 aesthetasc each on, about 1.2 times as long as articles 4-5 of peduncle combined. Epistome and upperlip distinctly articulate, lower lip (Fig.2F) with outer lobes bearing simple setules and short spines, inner apical margin with tooth. Mandibles with short palpar hump, right rakers 11,

incisor with 2 teeth, lacinia mobilis reduced (Fig.2D), left rakers 14, incisor with 3 teeth, lacinia mobilis with 4 teeth, outer teeth longer than inner (Fig.2E). Molars composed of short protrusions bearing spines, right and left molars with 9 medium to short spines. Palp article 1 short, article 2 with 1 short simple apicoventral seta, 2 medium pectinate medioventral setae, 1 simple ventroproximal setule, article 3 about 1.3 times as long as article 2, oblique apex with 1 long to medium simple setae. Inner plate of maxilla 1 (Fig.2A) with 4 short plumose setae and several simple setules; palp article 2 with 2 apicomedial spines and 6 medium pectinate submarginal setae. Maxilla 2 (Fig.2B) thin, plates extending subequally; outer plate broader than inner, with 4 medium

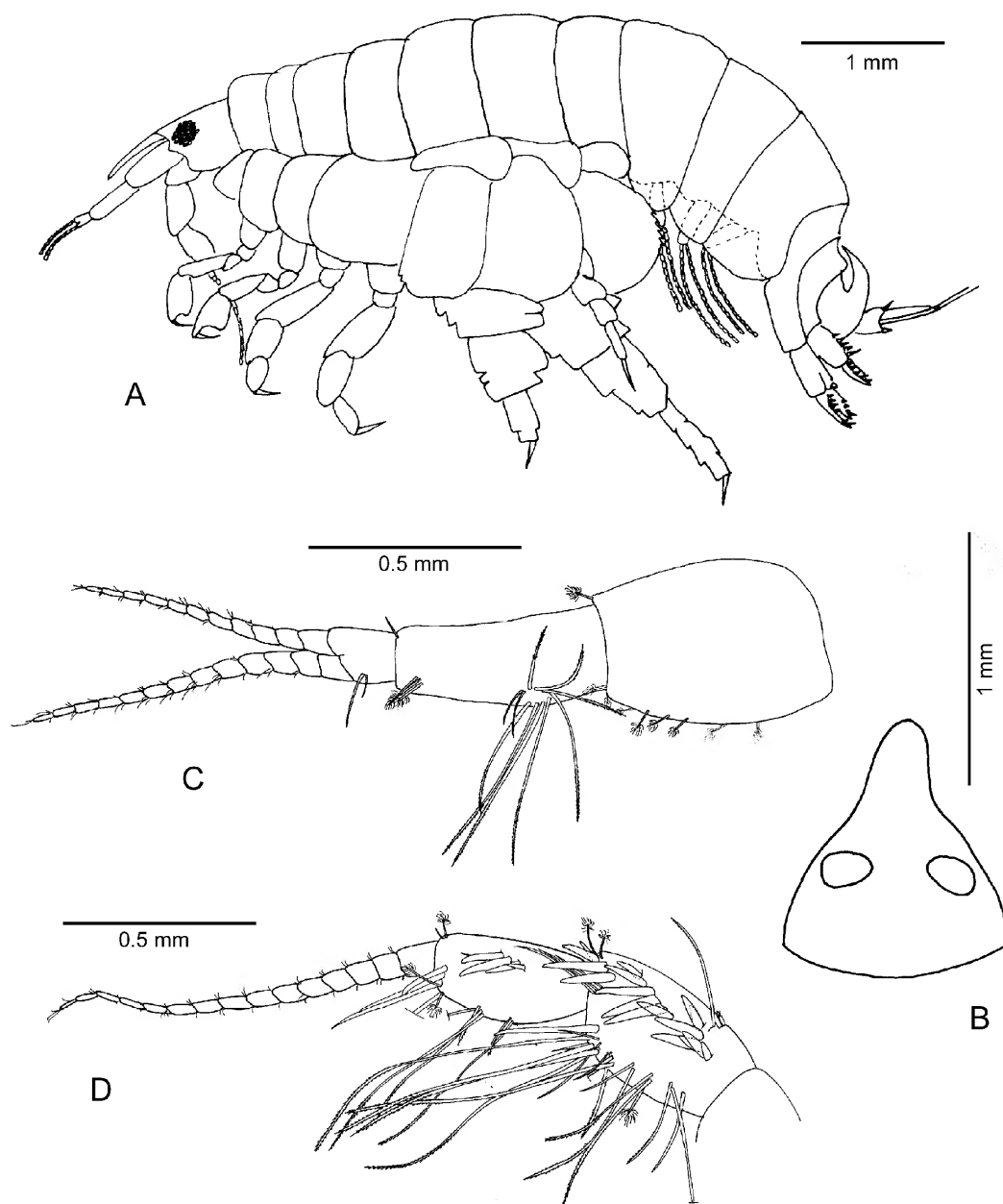


Fig.1- *Microphoxus breviramus* sp.nov. Holotype MNRJ9896 (♀ -6.4mm): (A) lateral view; (B) head; (C) antenna 1; (D) antenna 2.

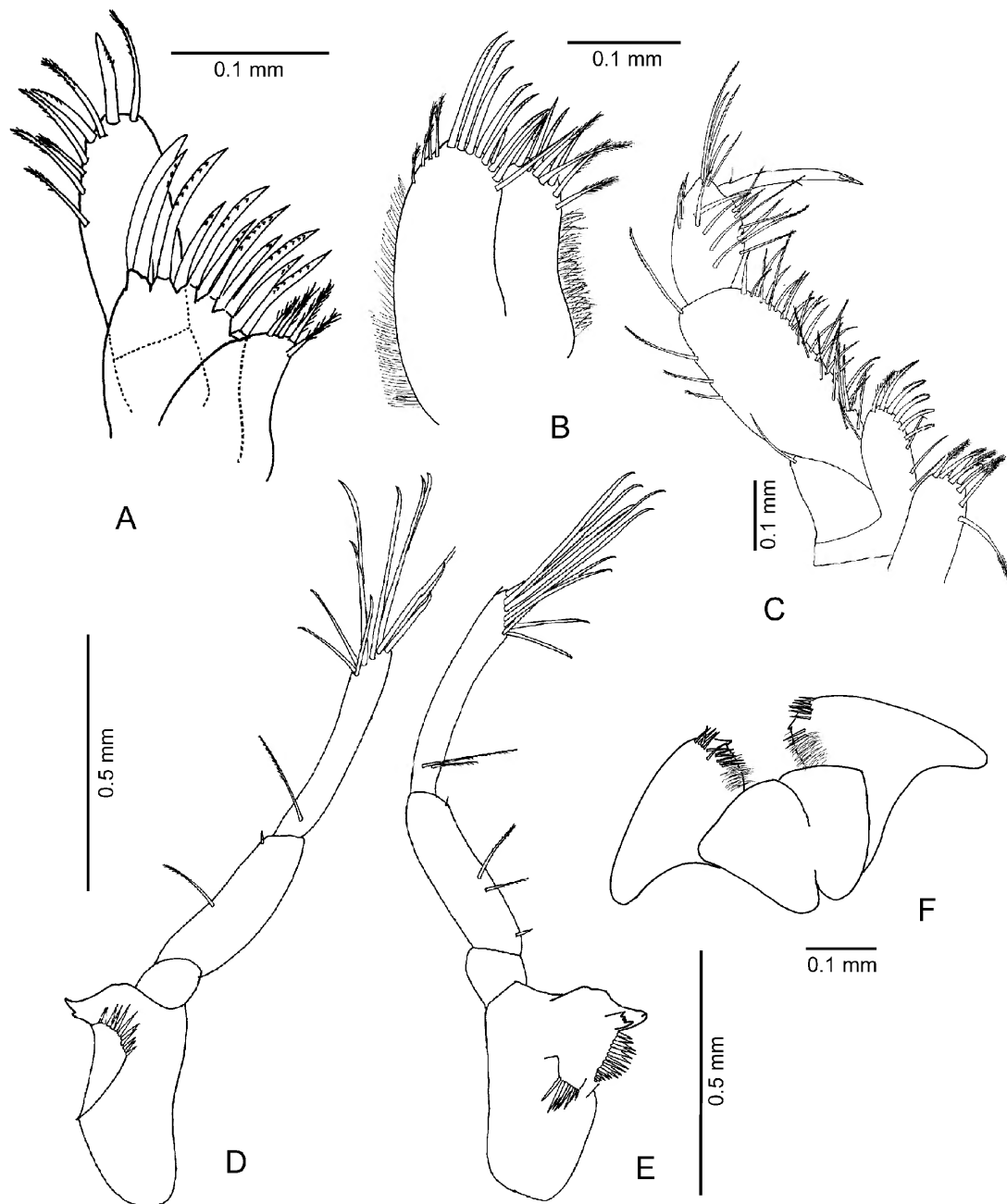


Fig.2- *Microphoxus breviramus* sp.nov. Holotype MNRJ9896 (♀ -6.4mm): (A) maxilla 1; (B) maxilla 2; (C)maxilliped; (D) right mandible; (E) left mandible; (F) lower lip.

plumose apicolateral setae and several bipectinate apical setae; inner plate with 2 medium plumose medial setae and several medium bipectinate apical setae. Inner plate of maxilliped (Fig.2C) with 2 thick apical spines, 4 medium plumose apicofacial setae and 2 medium plumose medial setae, outer plate with 4 medium bipectinados medial spines, 3 medium simple medial setae and 2 apical spines; palp article 1 with 1 medium simple apicolateral seta; article 2 with 1 long pectinate apicolateral seta, 3 medium and short pectinate lateral setae, inner margin bearing several long to medium simple and

pectinate setae; article 3 weakly produced, with 5 medium simple facial setae, 2 short pectinate lateral setae, 5 long to medium pectinate apical setae, inner margin with 8 long and medium pectinate setae; article 4 with several setules on inner margin, spine well developed and 1 accessory setule.

Gnathopods similar, width on articles 5-6 of gnathopods 1-2 (Figs.3A, B) equal 0.2-0.3 and 0.3-0.3, length equal 0.6-0.5 and 0.6-0.5; palmar humps slightly enlarged, palms almost transverse; article 5 of gnathopod 1 with long to short pectinate setae, slender than gnathopod 2, posterior margin

rounded; article 5 of gnathopod 2 with posterior margin rounded; rectangular propods with medium to short simple setae. Pereopods 3-4 similar; pereopod 3 (Fig.3C) with 6 facial setae on article 4 and 7 facial setae on article 5; pereopod 4 (Fig.3D) with 8 facial setae on article 4 and 6 facial setae on article 5, no posteroproximal spines; main spine of article 5 about 0.8 times as long as article 6; spine formula of article 6 on pereopods 3-4 equal 6+7, some long spines; weak acclivity on inner margin of dactyls. Article 2 of pereopod 5 without facial ridge (Fig.3E); articles with long to short plumose

and bipectinate setae; article 4 broad with rows of facial spines; width on articles 2-4-5-6 equal 0.6-1-0.7-0.3; length equal 1.2-0.5-0.6-0.5. Article 2 of pereopod 6 (Fig.3F) with facial ridge, articles with long to short plumose and bipectinate setae; article 4 broad with facial spines rows moderately developed; width on articles 2-4-5-6 equal 1.1-1.5-0.6-0.2, length equal 1.4-0.7-0.7-0.9. Article 2 of pereopod 7 (Fig.3G) exceeding apex of article 4, with facial ridge, posterior margin with 5 teeth and 1 simple posteroventral seta; width on article 3 like other; width on articles 2-4-5-6 equal 1-0.3-0.2-0.1; length equal 1.2-0.3-0.2-0.3.

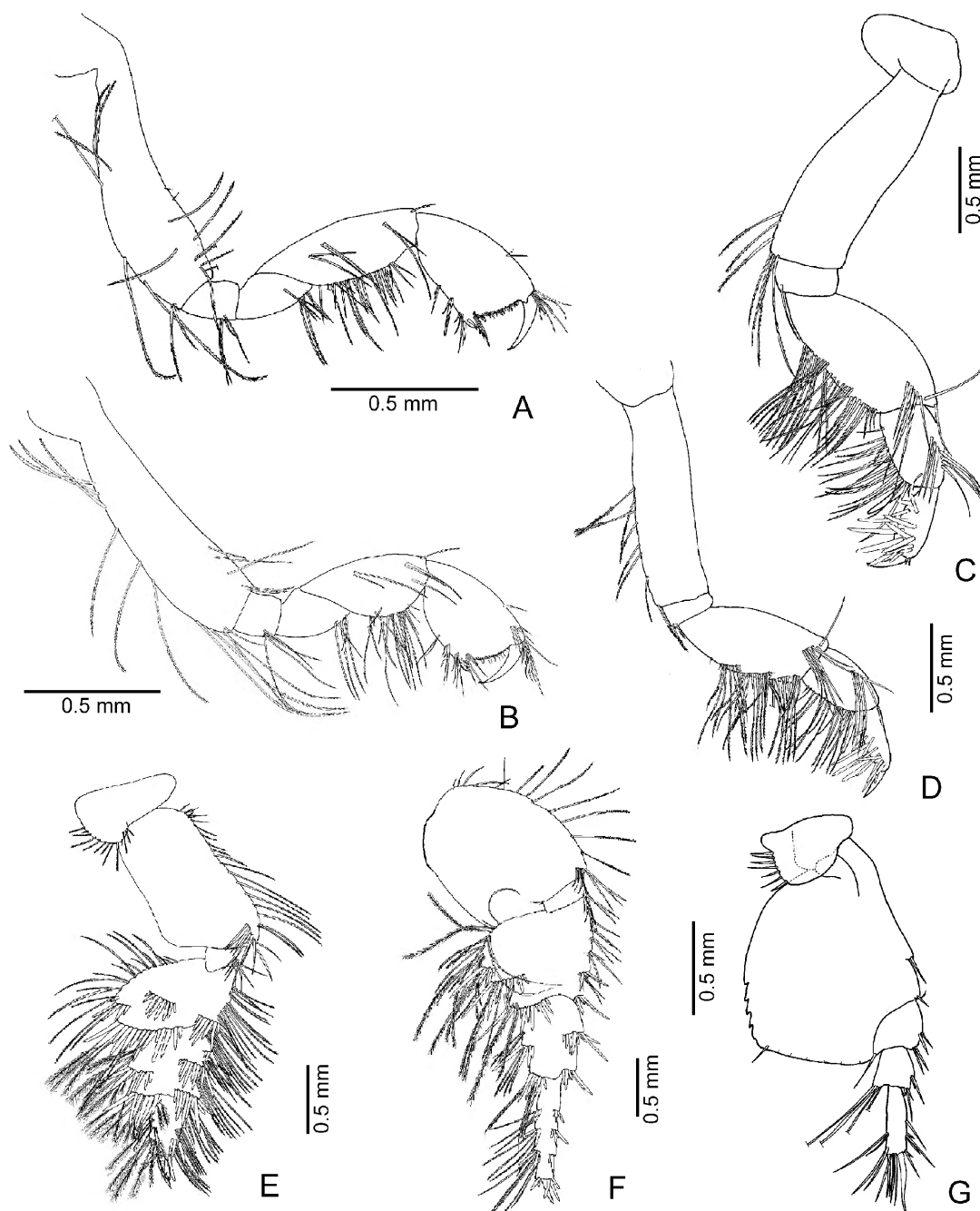


Fig.3- *Microphoxus breviramus* sp.nov. Holotype MNRJ9896 (♀ -6.4mm): (A) gnathopod 1; (B) gnathopod 2; (C) pereopod 3; (D) pereopod 4; (E) pereopod 5; (F) pereopod 6; (G) pereopod 7.

Main ventral setae of coxae 1-4 equal 21-18-16-29, bipectinate setae; coxa 1 (Fig.4A) weakly expanded apically, anterior margin convex, posterior straight, anterior setae smaller than posterior; coxae 2-3 (Figs.4B, C) with anterior setae smaller than posterior; coxa 4 (Fig.4D) with posterior pectinate setae smaller than anterior bipectinate, anterior and posterior margins divergents, posterior margin almost straight, posterodorsal corner rounded, width-length equal 1.1-0.9. Coxae 5-7 with posteroventral setal formula equal 13-10-7. Coxa 5 (Fig.4E) with pectinate setae; coxa 6 (Fig.4F) with

plumose setae; coxa 7 (Fig.4G) with simple setae. Posteroventral margin of epimeron 1 (Fig.4L) rounded bearing 4 medium and short plumose subfacial setae; posterior margin straight weakly serrate bearing 6 medium simple setae; anteroventral margin with 6 medium to short simple setae. Posteroventral margin of epimeron 2 rounded with 3 long and medium plumose subfacial setae; posterior margin straight weakly serrate bearing 6 long and medium simple setae; anteroventral margin with 4 medium simple subfacial setae. Posteroventral margin of epimeron 3 rounded, with

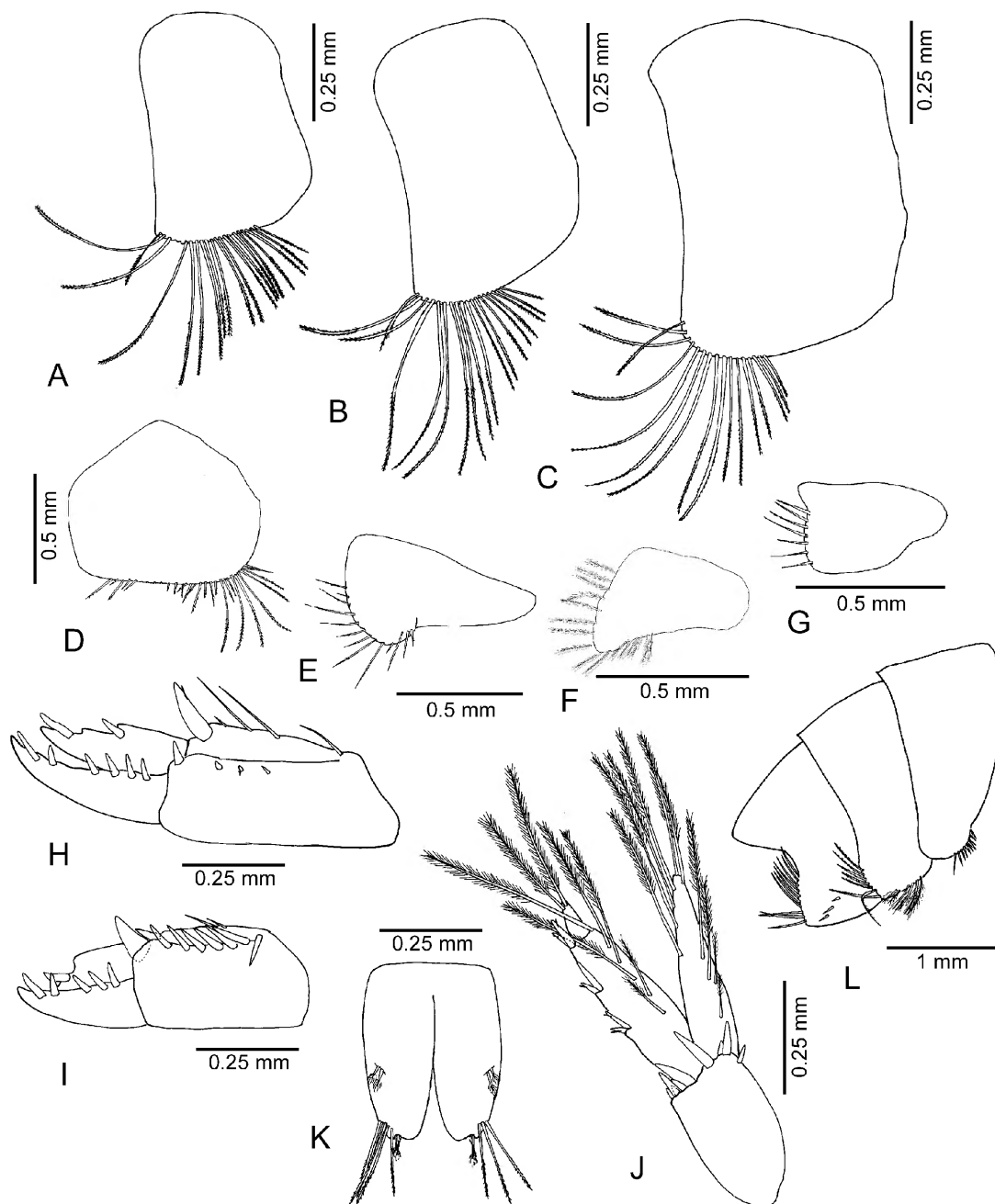


Fig.4- *Microphoxus breviramus* sp.nov. Holotype MNRJ9896 (♀ -6.4mm): (A) coxa 1; (B) coxa 2; (C) coxa 3; (D) coxa 4; (E) coxa 5; (F) coxa 6; (G) coxa 7; (H) uropod 1; (I) uropod 2; (J) uropod 3; (K) telson; (L) epimera 1-3.

row of 3 short simple facial setae; posterior margin concave weakly serrate bearing 10 long simple setae; ventral margin without setae. Rami of uropod 1 (Fig.4H) smaller than peduncle, without apical spines; outer ramus with 2 subapical spines, 4 dorsal spines; inner ramus with 1 subapical spine, 1 dorsal spine; no basofacial setae on peduncle, with 1 apicolateral spine, 3 small dorsal spines, 4 long to short simple marginal setae, 1 large apicomedial spine; apicolateral corner without comb. Uropod 2 (Fig.4I) with rami smaller than peduncle, no apical spines; outer ramus with 3 dorsal spines, 2 subapical spines; inner ramus without dorsal spines, with 1 subapical spine; peduncle with 7 dorsal spines, 1 large apicomedial spine, 1 large apicolateral spine, 2 medium simple dorsal setae; apicolateral corner without comb. Peduncle of uropod 3 (Fig.4J) with 5 ventral spines and 4 medial spines; inner ramus 1.1 times as long as article 1 of outer ramus, apex with 1 long plumose seta, medial and lateral margins with long and medium plumose setae, apicomedial margin of article 1 on outer ramus with 1 long plumose seta, lateral margin with 2 acclivities, spine formula equal 2-2-2, without setae; article 2 short, with 2 long plumose setae. Telson (Fig.4K) slightly elonged, length and width equal 0.5-0.4, almost fully cleft, with 2 plumose lateral setules, apex weakly excavate, rounded, bearing 5 long bipectinate dorsolateral setae, 2 plumose midapical setules. Urosomite 1 without lateral setule at base of uropod 1, with ventral setal brush. Urosomite 3 with hook dorsally on each side (Fig.1A).

Description of male – Rostrum narrower than in female, elonged, not reaching middle of article 2 on antenna 1 (Figs.5A, B). Article 2 of antenna 1 (Fig.5C) with 5 long and medium bipectinate ventral setae; primary flagellum with 10 articles, bearing 5-6 aesthetasc each on, 1 calceolus each on articles 1-3; accessory flagellum with 9 articles, 5-6 aesthetascs each on. Facial spine formula of article 4 on antenna 2 (Fig.5D) equal 1-2-6-4; article 5 with 3 facial spines, 6 groups of short simple dorsal setae, 1 distal calceolus; ventrodistal margin with 2 thin spines; ventral margin with 2 sets of 1 long pectinate seta and 1 plumose setule. Palp article 2 on maxilla 1 bearing 2 apicomedial spines, 3 medium plumose submarginal setae and 1 medium plumose apical seta. Inner plate of maxilla 2 with 3 medium plumose medial setae; outer plate with 3 medium plumose apicolateral setae. Right rakers 12, molar with 7 spines; left rakers 12, molar with 8 spines; article 3 of mandibular palp with 2 medium simple basofacial setae, oblique apex with 8 long to short setae. Gnathopods 1-2 similar, article 2 with 2 long pectinate posterior setae; width on articles 5-6 of

gnathopods 1-2 equal 1.1-2, and 1.1-2, length equal 4.4-3.5 and 4.1-3.5; propods with simple setae, palms almost tranverse; posteroir margin of article 5 rounded, with long and medium pectinate setae. Article 2 of pereopod 3 with 4 long to short bipectinate posterior setae; article 4 with 5 long bipectinate facial setae, several long bipectinate ventral setae; article 5 with 5 long bipectinate facial setae, several bipectinate ventral setae, facial spine formula of article 6 equal 5+6. Article 2 of pereopod 4 with 2 short pectinate setae, 2 long bipectinate posterior setae; article 4 with 6 long pectinate facial setae, several long pectinate ventral setae; article 5 with 4 long pectinate facial setae, several pectinate ventral setae; facial spine formula of article 6 equal 5+6. Article 2 of pereopod 5 without facial ridge; articles with bipectinate and plumose setae; article 4 broad, with facial spines row moderately developed; width on articles 2-4-5-6 equal 0.5-0.6-0.4-0.2 and length equal 0.9-0.4-0.4-0.4. Pereopod 6 like female.

Article 5 of pereopod 7 (Fig.6D) without posteroventral spine; article 2 narrower than in female, with 2 facial ridge. Epimera 1-3 broad; epimeron 1 with 16 short simple anteroventral setae; epimeron 2 with 7 long plumose facial setae, 4 medium simple posterior setae; epimeron 3 with 6 long bipectinate posterior setae, anteroventral margin with 3 facial spines, 5 simple setae. Urosomite elongate, narrow, articulation lines not defined. Rami of uropod 1 (Fig.6A) slightly smaller than peduncle; outer ramus with 3 dorsal spines, 1 subapical spine; length of inner ramus like peduncle, with 1 dorsal spine, no apical and supapical spines; peduncle with 1 short simple marginal seta, no basofacial setae, with 1 thick apicomedial spine, with 1 large apicolateral spine, apicolateral corner without comb. Rami of uropod 2 (Fig.6B) smaller than peduncle, outer ramus with 2 accessory spines, 2 dorsal spines; inner ramus without apical spines, with 1 subapical spine; peduncle with 3 dorsal spines, 1 thick apicolateral spine, 1 short simple marginal seta, 1 thick apicomedial spine; apicolateral corner without comb. Peduncle of uropod 3 (Fig.6C) with 3 ventral spines and 1 dorsal spine; inner ramus as long as article 1 of outer ramus, medial and lateral margins with plumose setae; lateral margin of outer ramus with 2 acclivities, spine formula equal 2-2-2, setal formula equal 1-0-0, medial margin with long plumose setae; article 2 short, with 2 long plumose setae. Telson (Fig.6E) elonged, length-width equal 3.5-3.0; almost fully cleft, with 2 plumose lateral setules; apex weakly excavate, rounded, 4 long plumose dorsolateral setae, 1 spine and 1 plumose setule midapical.

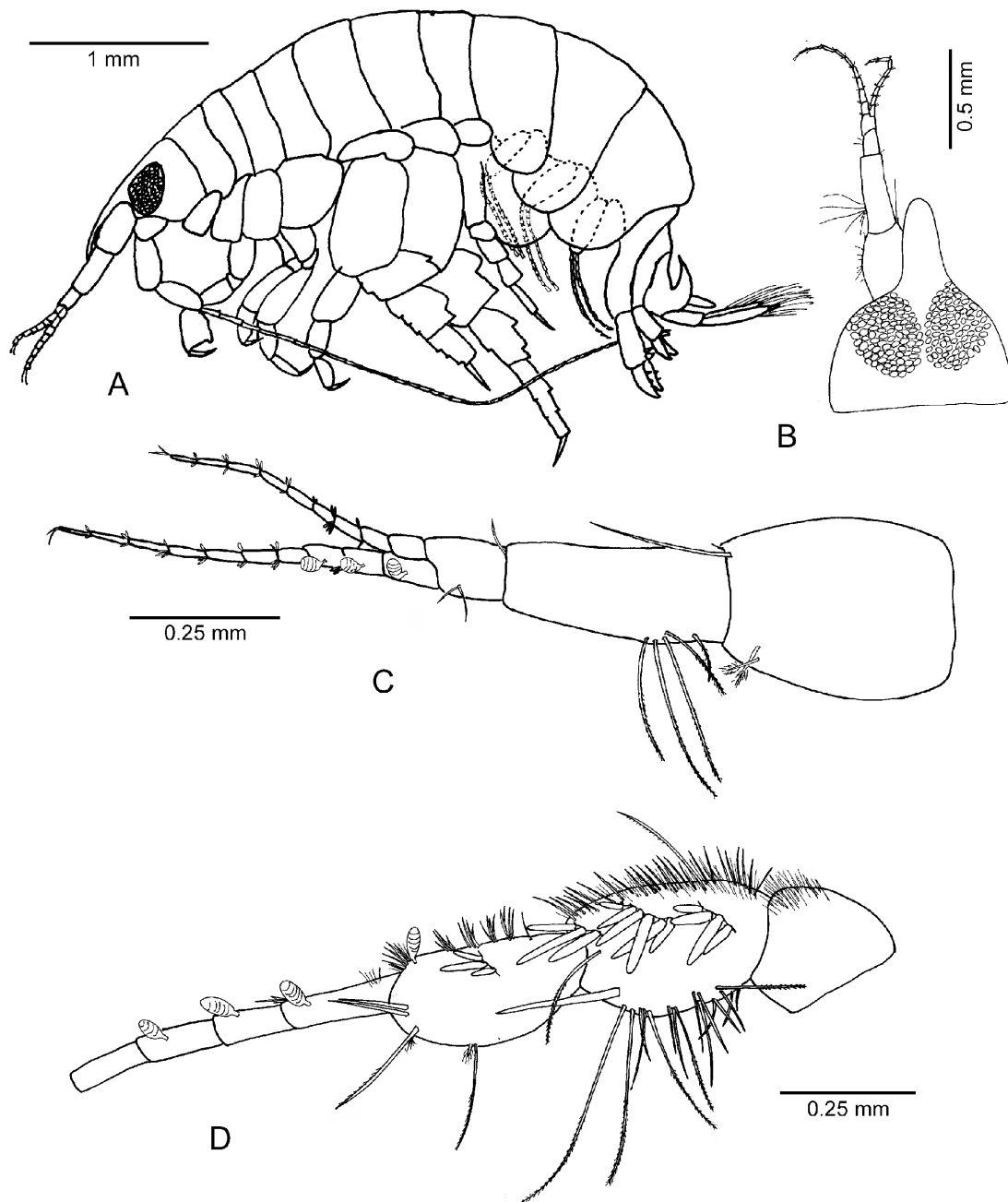


Fig.5- *Microphoxus breviramus* sp.nov. Paratype MNRJ13523 (♂ -6.0mm): (A) lateral view; (B) head; (C) antenna 1; (D) antenna 2.

Etymology – *brevi* (latin)+*ramus* (latin)], refer to the short rami of uropods 1-2.

Variations – The young specimens show a smaller number of setae and spines, with variations in the following characteristics: article 2 of antenna 1 with 7 long to short bipectinate ventroproximal setae; primary flagellum with 9-11 articles; accessory flagellum with 8-9 articles; article 5 of antenna 2 with 3 facial spines; ventral margin of article 5 on antenna 2 with 2 sets of bipectinate setae; flagellum of antenna 2 with 14 articles; outer ramus of uropod

1 with 3 dorsal spines; peduncle of uropod 1 without dorsal spines; peduncle of uropod 1 with 2 simple marginal setae and peduncle of uropod 2 with 7 dorsal spines.

Remarks – The genus *Microphoxus* resembles *Metharpinia* Schellenberg, 1931 and *Birubius* Barnard & Drumond, 1976, but differs from them mainly by the dorsal hook on urosomite 3. It resembles *Tickalerus* Barnard & Drumond, 1978 and *Kulgaphoxus* Barnard & Drumond, 1978 in dorsal hook. It differs from *Tickalerus* by a different hook

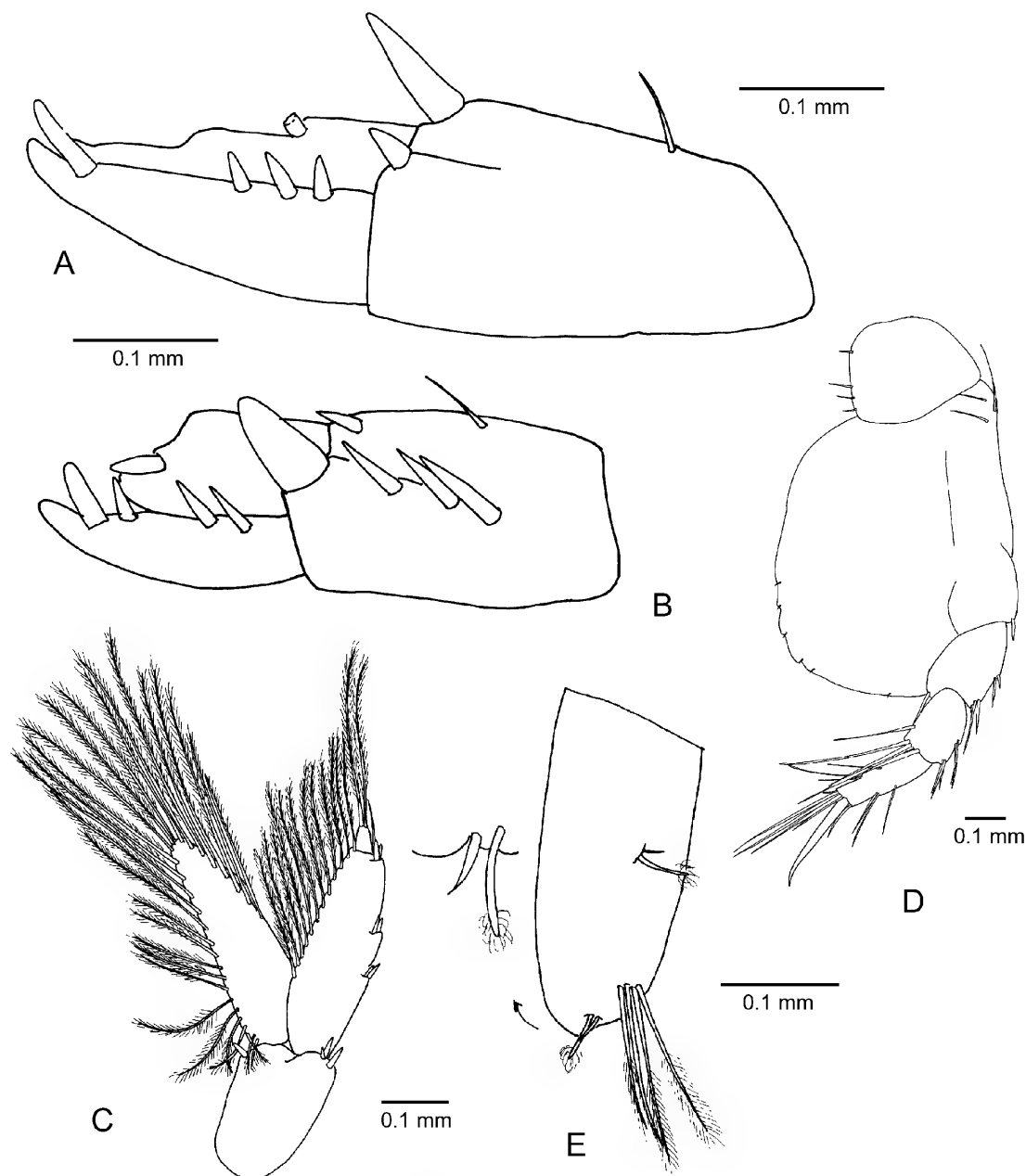


Fig.6- *Microphoxus breviramus* sp.nov. Paratype MNRJ13523 (♂ -6.0mm): (A) uropod 1; (B) uropod 2; (C) uropod 3; (D) pereopod 7; (E) telson.

shape only one set of dorsal setae on article 4 of antenna 2; and the telson weakly setose. It differs from *Kulgaphoxus* by the lack of apical spines on rami of uropods 1-2, the telson weakly setose; and the coxa 4 not being rectangular. *M. breviramus* sp.nov. differs from *M. minimus* by: a slender rostrum, reaching article 1 of antenna 1; the facial setae on epimeron 3 present; the presence of 4 groups of facial spines on article 4 of antenna 2; and smaller rami on uropods 1-2. It differs from *M. cornutus* by the lack of a displaced spine on peduncle of uropod 1; the rami on uropods 1-2 smaller; a great number of spines on article 4 of antenna 2; the presence of 1 seta and 2

spines on the ridge of article 4 on antenna 2; 2 teeth on the incisor; reduced lacinia mobilis; and the reduced number of teeth on article 2 of pereopod 7.

Microphoxus uroserratus sp.nov.
(Figs.7-12)

Material examined – Holotype: MNRJ9827-1♀ (6.5mm - dissected and drawing), Sepetiba Bay, RIO DE JANEIRO, BRAZIL, 22°58'S-44°02'W, S.H.G.Silva col., 1977. Paratypes: MNRJ13524-4♂ (3.0mm; 3.0mm; 3.5mm; 3.5mm-1 dissected and drawing) e 32♀ (6.0 a 6.5mm), *ibid.*

Diagnosis – Rostrum reaching middle of article 2

on antenna 1. Article 4 of antenna 2 with 4 groups of setae on ventral margin. Lacinia mobilis with 2 teeth. Coxa 1 with posteroventral setae. Rami of uropods 1-2 longer than peduncle. Peduncle of uropod 1 without displaced spine; inner ramus with 1 dorsal spine row. Peduncle of uropod 2 with marginal spines; inner ramus without dorsal spines. Outer ramus of uropod 3 with 2 long simple setae on article 2. Epimeron 3 with 7 short simple facial setae in row. Urosomite 3 with dorsal hook. Telson with 5 long simple dorsolateral setae.

Description of female – Head about 22% times of total body length (Fig.7A), greatest width about 45% of length in dorsal view (Fig.7B). Rostrum constricted, narrow, elongated, reaching middle of article 2 on antenna 1. Eyes medium, ovate, reddish pigments, rounded ommatidia. Article 1 of peduncle on antenna 1 (Fig.7C) 1.2 times as long as wide, about 1.7 times as wide as article 2; ventral margin with 3 plumose setules; dorsal apex not produced, with 1 setule and 1 medium plumose seta. Article 2 on peduncle about 0.6 times as long as article 1,

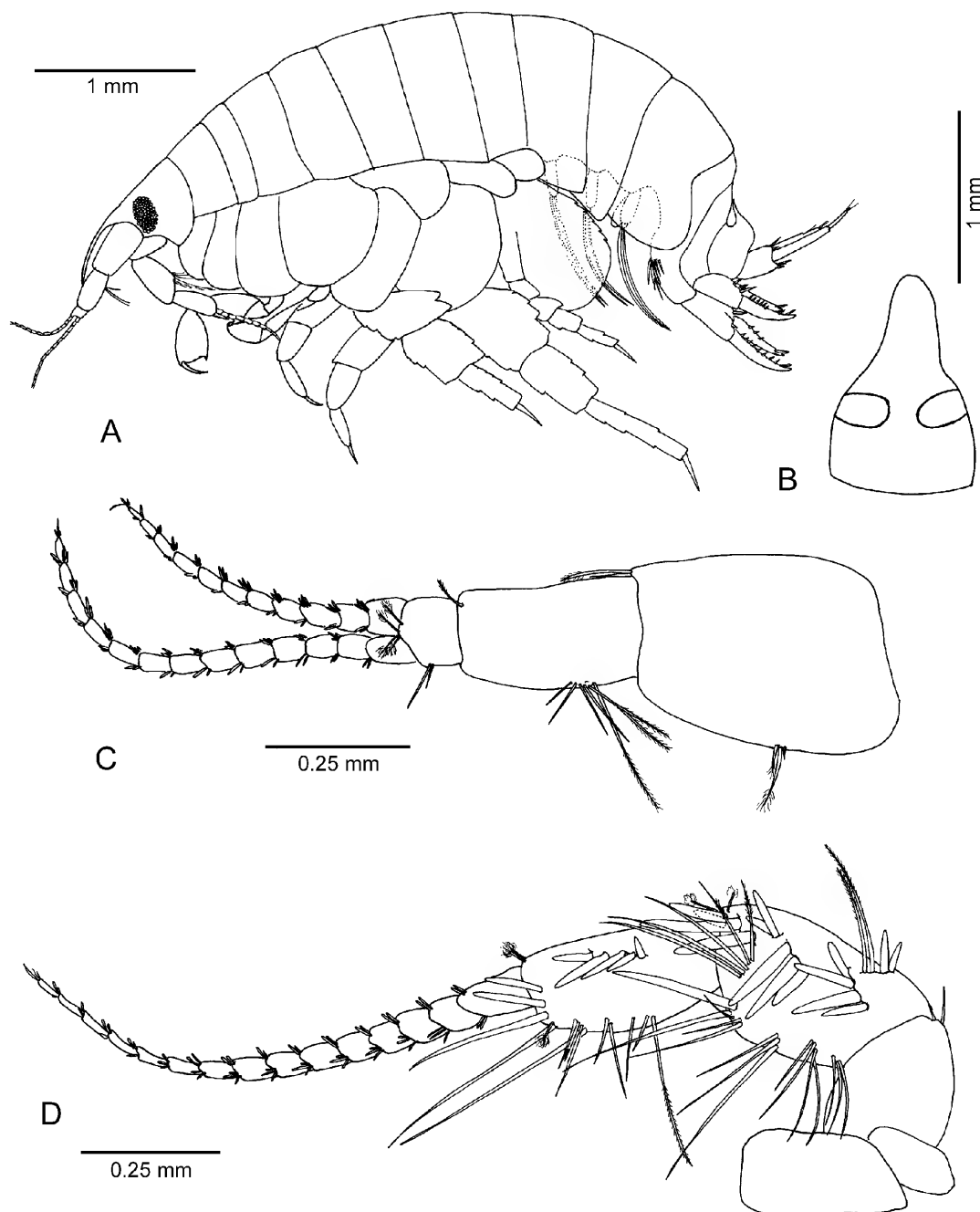


Fig.7- *Microphoxus uroserratus* sp.nov. Holotype MNRJ9827 (♀ -6.5mm): (A) lateral view; (B) head; (C) antenna 1; (D) antenna 2.

with 8 long to short bipectinate ventroproximal setae and 1 plumose apicodorsal setule; primary flagellum with 13 articles, short aesthetasc each on, about 1.7 times as long as peduncle; accessory flagellum with 11 articles, short aesthetasc each on. Facial spine formula of article 4 on antenna 2 (Fig.7D) equal 1-3-5-4, medium and short thick spines; dorsal margin with 2 distal setules, notch bearing 2 long bipectinate setae and 2 spines; ventral margin with 4 groups of 3-4 long and medium bipectinate setae and 1 medium ventrodiscal spine; article 5 about 0.8 times as long as article 4, with 5 facial

spines, dorsal margin smooth with 2 plumose distal setules, ventral margin with 5 sets of 1-4 long to short bipectinate setae and 3 long and medium distal spines placed subfacially and 1 plumose distal setule; flagellum with 15 articles, 1.1 times as long as articles 4-5 of peduncle combined. Epistome and upperlip distinctly articulate; outer lobes of lower lip (Fig.8F) with simple short setae and simple setules; inner apical margin with teeth, inner lobe smooth. Mandibles with small palpar hump; right rakers 7, incisor with 3 teeth, lacinia mobilis reduced (Fig.8D), left rakers 11, incisor with 2 teeth,

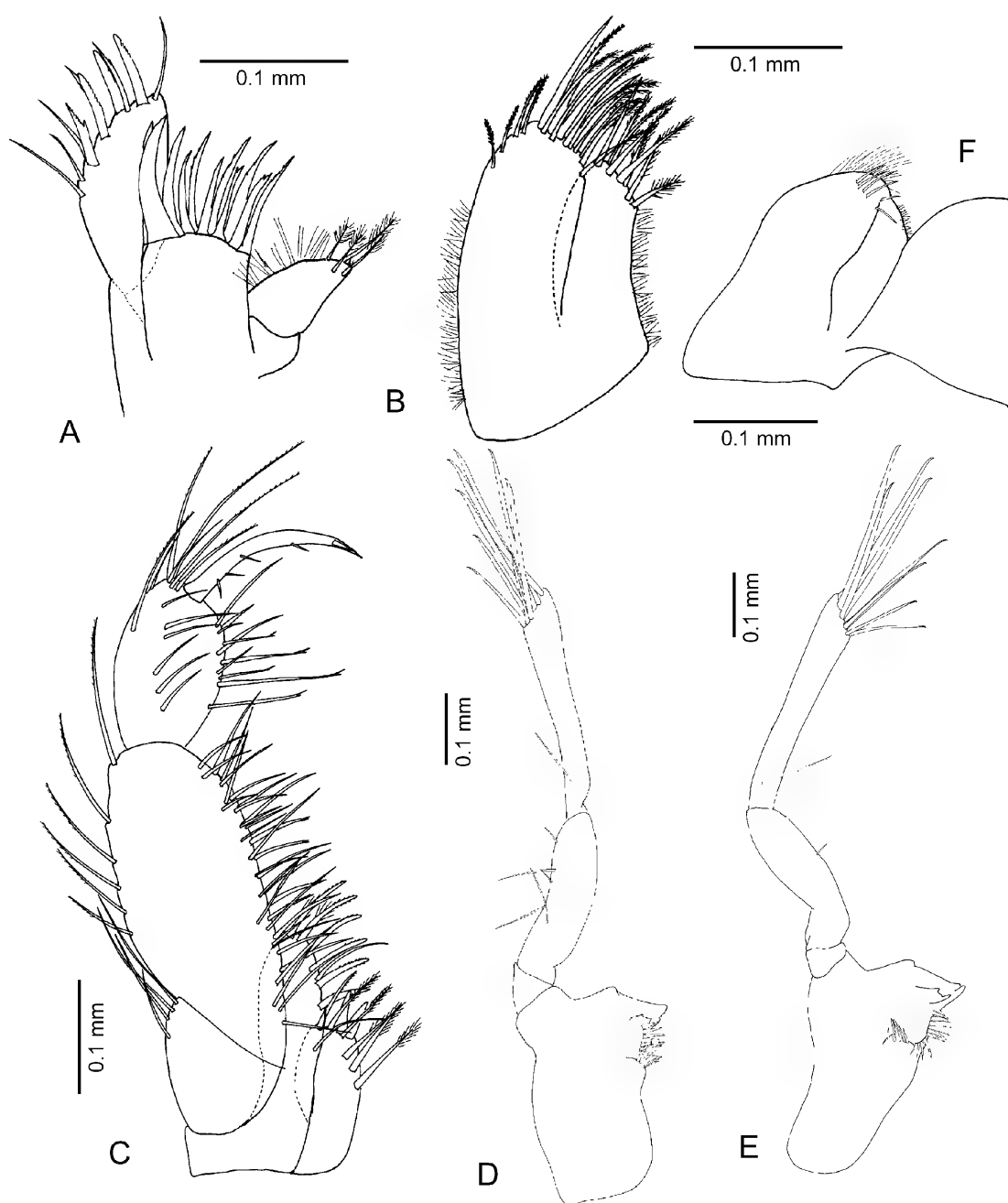


Fig.8- *Microphoxus uroserratus* sp.nov. Holotype MNRJ9827 (♀ -6.5mm): (A) maxilla 1; (B) maxilla 2; (C) maxilliped; (D) right mandible; (E) left mandible; (F) lower lip.

lacinia mobilis with 2 teeth, proximal teeth longer than distal (Fig.8E). Molars composed of short protrusions with spines; right molar with 7 medium and short spines; left molar with 7 medium spines. Palp article 1 short; article 2 with 1 simple short apicoventral seta and 1 short simple ventroproximal seta, 1 medium simple midventral seta; article 3 about 1.3 times as long as article 2, oblique apex with 9 long and medium simple setae, 2 long simple basofacial setae. Maxilla 1 (Fig.8A) with 4 short plumose setae and several simple setules on inner plate; palp article 2 with 4 apicomedial spines and 6 medium simple submarginai setae. Maxilla 2 (Fig.8B) thin; plates extending subequally; outer plate broader than inner, with 4 short plumose apicolateral setae and several medium plumose apical setae; inner plate with 2 short plumose medial setae and several medium plumose apical setae. Inner plate of maxilliped (Fig.8C) with 2 thick apical spines, 3 medium plumose apicofacial setae and 3 medium plumose medial setae; outer plate with 4 medial spines, 2 apical spines, 4 medium simple medial setae; palp article 1 with 4 long and medium simple apicolateral setae; article 2 with 1 long pectinate apicolateral seta, 5 long pectinate lateral setae, inner margin with several medium and short simple setae; article 3 not produced, with 6 medium simple facial setae, 2 long pectinate lateral setae, 5 long and medium pectinate apical setae, inner margin with 10 long and medium simple setae; inner margin of article 4 with 4 simple setules, spine well developed.

Gnathopods similar; width of gnathopods 1-2 on articles 5-6 (Figs.9A, B) equal 0.2; 0.2 and 0.2;0.3, length equal 0.5; 0.5 and 0.5;0.5; palmar humps slightly enlarged; palms almost transverse; article 5 of gnathopod 1 with long to short pectinate setae, slender than gnathopod 2, posterior margin rounded; article 5 of gnathopod 2 with posterior margin rounded; rectangular propods, with long to short simple setae. Pereopods 3-4 similar; article 4 of pereopod 3 (Fig.9C) with 6 long pectinate facial setae and article 5 with 6 facial setae; weak acclivity on inner margin of dactyls, with 1 plumose seta; article 4 of pereopod 4 (Fig.9D) with 8 facial setae and article 5 with 6 facial setae, no posteroproximal spines; main spine of article 5 extending 0.8 times on article 6; spine formula of article 6 on pereopods 3-4 equal 6+7 and 7+7, some spines especially long; weak acclivity on inner margin of dactyls. Article 2 of pereopod 5 (Fig.9E) without facial ridge, article 2 with long and medium pectinate setae; articles 4-6 with long and medium plumose and simple setae; article 4 broad, with facial spines row moderately developed; width on articles 2-4-5-6 equal 0.6-0.7-0.5-0.2; length equal 0.1-0.5-0.6-0.4. Pereopod 6 (Fig.9F) without facial

ridge on article 2; article 4 broad, with facial spines rows moderately developed; width on articles 2-4-5-6 equal 0.9-0.6-0.4-0.1; length equal 0.1-0.9-0.7-0.6. Pereopod 7 (Fig.9G) with facial ridge on article 2; article 2 reaching apex of article 5, posterior margin serrate and with simple setules; width on article 3 like other; width on articles 2-4-5-6 equal 0.8-0.2-0.2-0.1; length equal 0.1-0.3-0.2-0.4.

Main ventral setae of coxae 1-4 equal 25-8-7-15, bipectinate setae; coxa 1 (Fig.10A) weakly expanded apically, anterior margin straight, anterior setae longer than posterior; coxae 2-3 (Figs.10B, C) with anterior setae smaller than posterior; coxa 4 (Fig.10D) with anterior setae longer than posterior, anterior and posterior margins divergents, posterior margin almost straight, posterodorsal corner rounded, width-length equal 0.8:0.9. Posteroventral setae formula on coxae 5-7 (Figs.10E, F, G) equal 14-8-3, medium to short bipectinate setae. Epimeron 1 (Fig.10L) with posteroventral margin rounded and with 3 short plumose setae; posterior margin almost straight, weakly serrate, with 2 short plumose setae; anteroventral margin with 6 short simple setae. Epimeron 2 (Fig.10M) with posteroventral margin rounded; posterior margin straight, weakly serrate, with 7 short simple setae; ventral margin with 1 medium plumose facial seta. Epimeron 3 (Fig.10N) with posteroventral margin rounded and with 7 short simple facial setae in row; posterior margin concave, weakly serrate, with 8 medium simple setae; ventral margin without setae. Rami of uropod 1 (Fig.10H) longer than peduncle, without apical spines; outer ramus with 2 subapical spines, 6 dorsal spines; inner ramus with 1 subapical spine, 3 dorsal spines; peduncle without basofacial setae, with 1 apicolateral spine, no dorsal spines, 2 spines and 2 short simple marginal setae, 1 apicomedial spine longer than other, apicolateral corner with comb. Rami of uropod 2 (Fig.10I) longer than peduncle, without apical spines; outer ramus with 7 dorsal spines, 2 subapical spines; inner ramus without dorsal spines, with 1 subapical spine; peduncle with 3 marginal spines, 2 spines and 1 medium simple dorsal seta, 1 large apicolateral spine; apicolateral corner with comb. Peduncle of uropod 3 (Fig.10J) with 5 ventral spines, 1 medial spine and 1 dorsal spine; inner ramus 0.9 times as long as article 1 of outer ramus, apex with 1 medium plumose seta, medial margin with medium plumose setae; apicomedial margin of article 1 on outer ramus with 3 medium plumose setae, lateral margin with 2 acclivities; spine formula equal 1-2-2, without setae; article 2 elonged, with 2 medium simple setae. Telson (Fig.10K) slightly elonged, width-length equal 0.4-0.3, almost fully

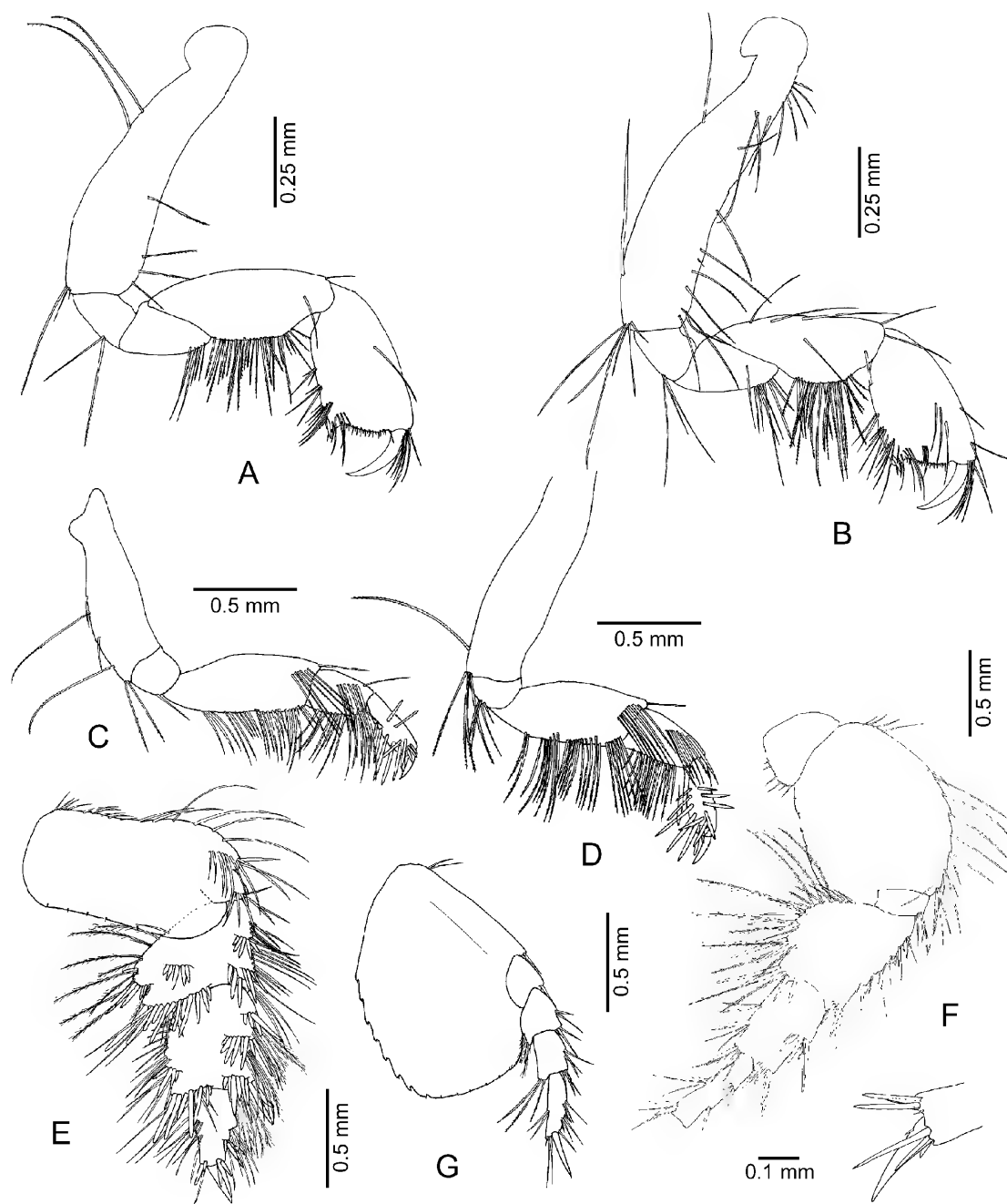


Fig.9- *Microphoxus uroserratus* sp.nov. Holotype MNRJ9827 (♀ -6.5mm): (A) gnathopod 1; (B) gnathopod 2; (C) pereopod 3; (D) pereopod 4; (E) pereopod 5; (F) pereopod 6; (G) pereopod 7.

cleft, with 2 plumose lateral setules, apex weakly excavate, rounded, 5 long simple dorsolateral setae, 2 spines and 1 plumose midapical setule. Urosomite 1 with simple lateral setule at base of uropod 1, with medium simple ventral setal brush. Urosomite 3 with short hook dorsally on each side (Fig.7A).

Description of male – Rostrum like female (Fig.11B), elonged, reaching middle of article 2 on antenna 1 (Fig.11A). Article 2 of antenna 1 (Fig.11C) with 4 medium and short pectinate ventral setae; primary

flagellum with 10 articles, 5-6 long aesthetasc each on, 1 calceolus each on articles 3-4; accessory flagellum with 8 articles, 5-6 aesthetasc each on. Facial spine formula of article 4 on antenna 2 (Fig.11D) equal 1-2-5-3; article 5 with 3 facial spines, 5 groups of short simple dorsal setae, 1 distal calceolus; ventrodistal margin with 2 medium thin spines; ventral margin with 1 plumose setule and 1 medium pectinate seta. Palp article 2 on maxilla 1 bearing 3 apicomedial spines, 6 medium simple setae

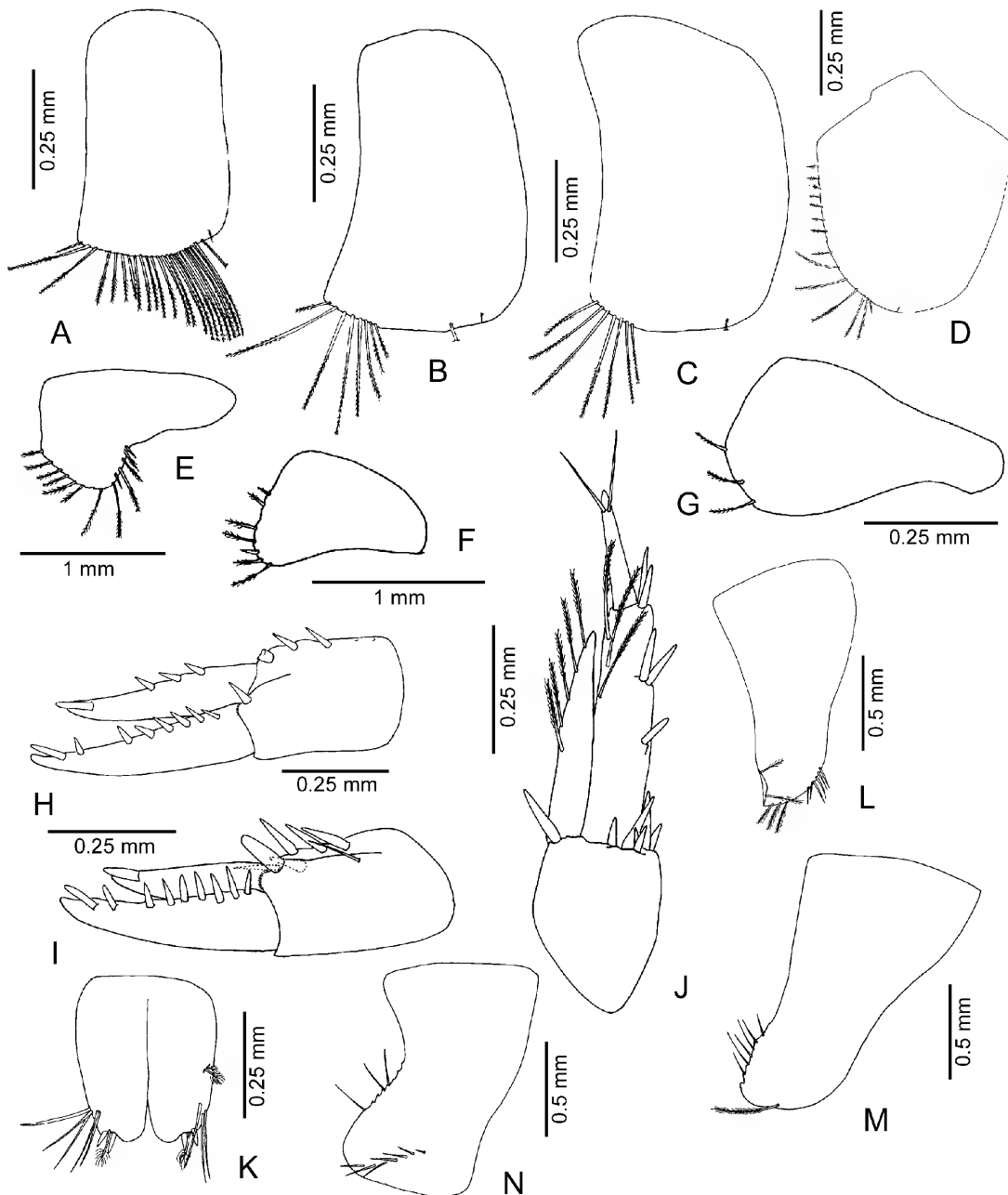


Fig.10- *Microphoxus uroserratus* sp.nov. Holotype MNRJ9827 (♀ -6.5mm): (A) coxa 1; (B) coxa 2; (C) coxa 3; (D) coxa 4; (E) coxa 5; (F) coxa 6; (G) coxa 7; (H) uropod 1; (I) uropod 2; (J) uropod 3; (K) telson; (L) epimeron 1; (M) epimeron 2; (N) epimeron 3.

and simple setules. Inner plate of maxilla 2 with 3 medium plumose medial setae; outer plate with 2 short apicolateral setae. Right rakers 11, molar with 6 spines; left rakers 12, molar with 6 spines; article 3 of mandibular palp with 2 medium simple basofacial setae. Gnathopods 1-2 similar, article 2 without long posterior setae; width on articles 5-6 equal 0.4-0.3, length equal 0.3-0.3, palms almost transverse; article 5 elonged, ovate, posterior margin rounded, with long and medium simple setae. Article 2 of pereopod 3 with 1 long posterior seta; article 4

with 6 long facial setae; article 5 with 6 long facial setae, facial spine formula of article 6 equal 5+5. Article 2 of pereopod 4 with 2 long posterior setae; article 4 with 4 long facial setae; article 5 with 4 facial spines; facial spine formula of article 6 equal 6+6. Article 2 of pereopod 5 without facial ridge; articles with plumose and simple setae; article 4 broad, with facial spine rows; width on articles 2-4-5-6 equal 0.4-0.4-0.3-0.1, length equal 0.7-0.3-0.3-0.4. Pereopod 6 like female. Article 5 of pereopod 7 (Fig.12D) without posteroventral spine. Main ventral

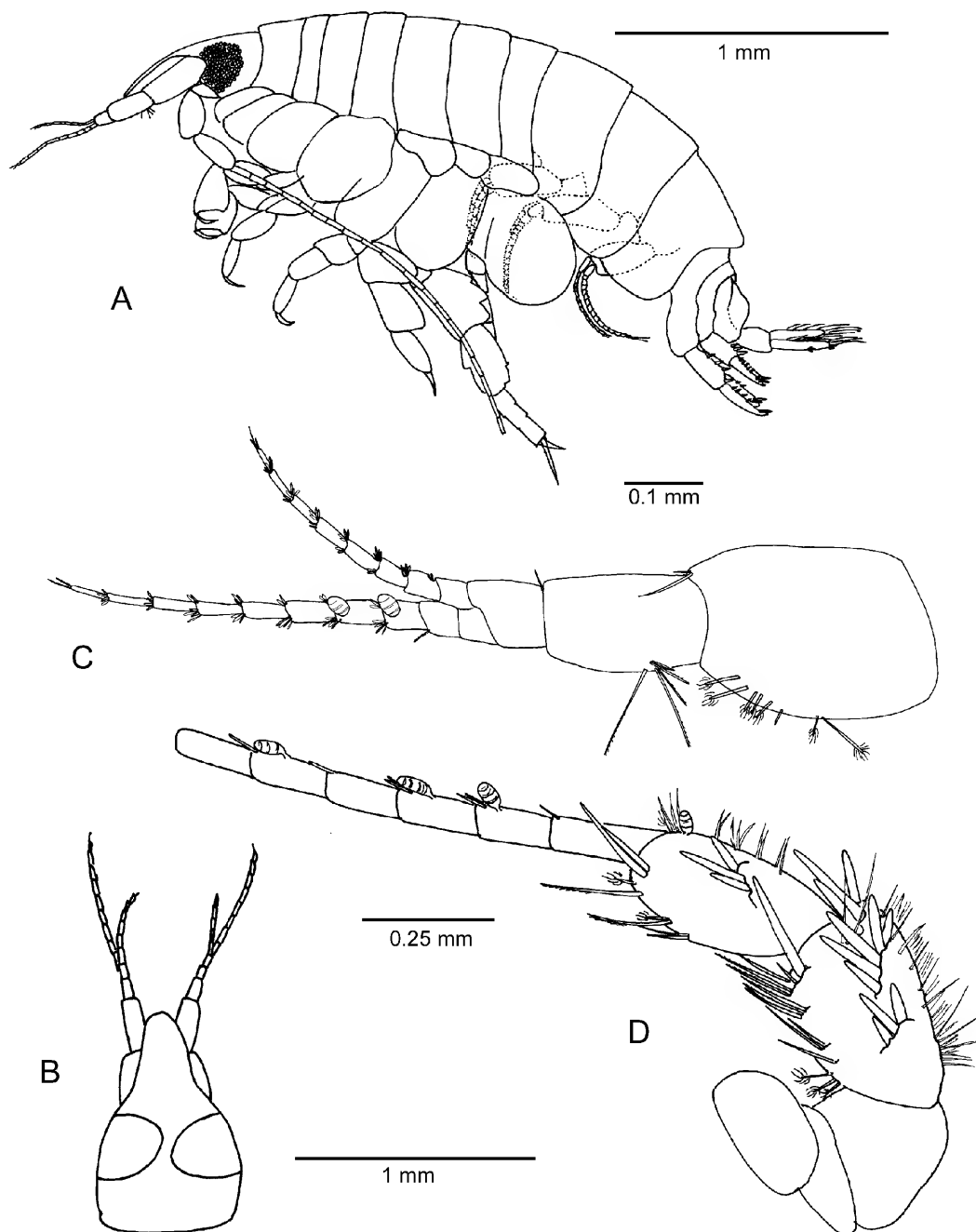


Fig.11- *Microphoxus uroserratus* sp.nov. Paratype MNRJ13524 (♂ -3.5mm): (A) lateral view; (B) head; (C) antenna 1; (D) antenna 2.

setae of coxae 1-4 equal 15-6-6-7; coxa 4 like female, width-length equal 0.3-0.3; coxae 1-3 and 5 with simple setae, coxae 4 and 6 with plumose posterior setae. Epimera 1-3 broad; epimeron 1 with 7 anteroventral setae; epimeron 2 with 4 simple basofacial setae, 4 posterior setae; epimeron 3 with 5 short simple facial setae, 1 ventral seta, 3 medium simple posterior setae. Urosome elonged, narrow, articulation lines defined. Outer ramus of uropod 1 (Fig.12A) longer than peduncle, with 4 dorsal

spines and 2 subapical spines; length of inner ramus like peduncle, with 1 dorsal spine, without apical spines, with 1 subapical spine; peduncle with 2 marginal spines, without basofacial setae, with 1 thick apicomedial spine, apicolateral corner with comb. Outer ramus of uropod 2 (Fig.12B) longer than peduncle, with 2 subapical spines, 4 dorsal spines; length of inner ramus like peduncle, no apical spines; no dorsal spine, with 1 subapical spine; peduncle with 3 dorsal spines, 1 large

apicolateral spine, 4 marginal spines, 1 apicomedial spine longer than other; apicolateral corner with comb. Uropod 3 (Fig.12C) with 6 ventral spines and 2 dorsal spines on peduncle; length of inner ramus like article 1 of outer ramus, medial and lateral margins with long plumose setae; lateral margin of outer ramus with 2 activities, spine formula equal 2-2 and setal formula equal 0-1. Telson (Fig.12E) elonged, length-width equal 0.3-0.4, almost fully cleft, with 1 plumose setule and 1 medium plumose lateral seta; apex weakly excavate, rounded, 2 long simple dorsolateral setae, 2 spines and 1 medium plumose midapical seta.

Etymology – [*uro* (Greek)+*serra* (latin)], refer to the apicolateral corner of peduncle on uropods 1-2 with comb.

Variations – Special attention should be given to young specimens because they present smaller number of setae and spines, with variation in the following characteristics in the specimens studied: outer ramus of uropod 1 with 4 dorsal spines; inner ramus of uropod 1 with 1 dorsal spine; outer ramus of uropod 2 with 4 dorsal spines.

Remarks – *Microphoxus uroserratus* sp.nov. differ from *M. minimus* by a greater number of spines in

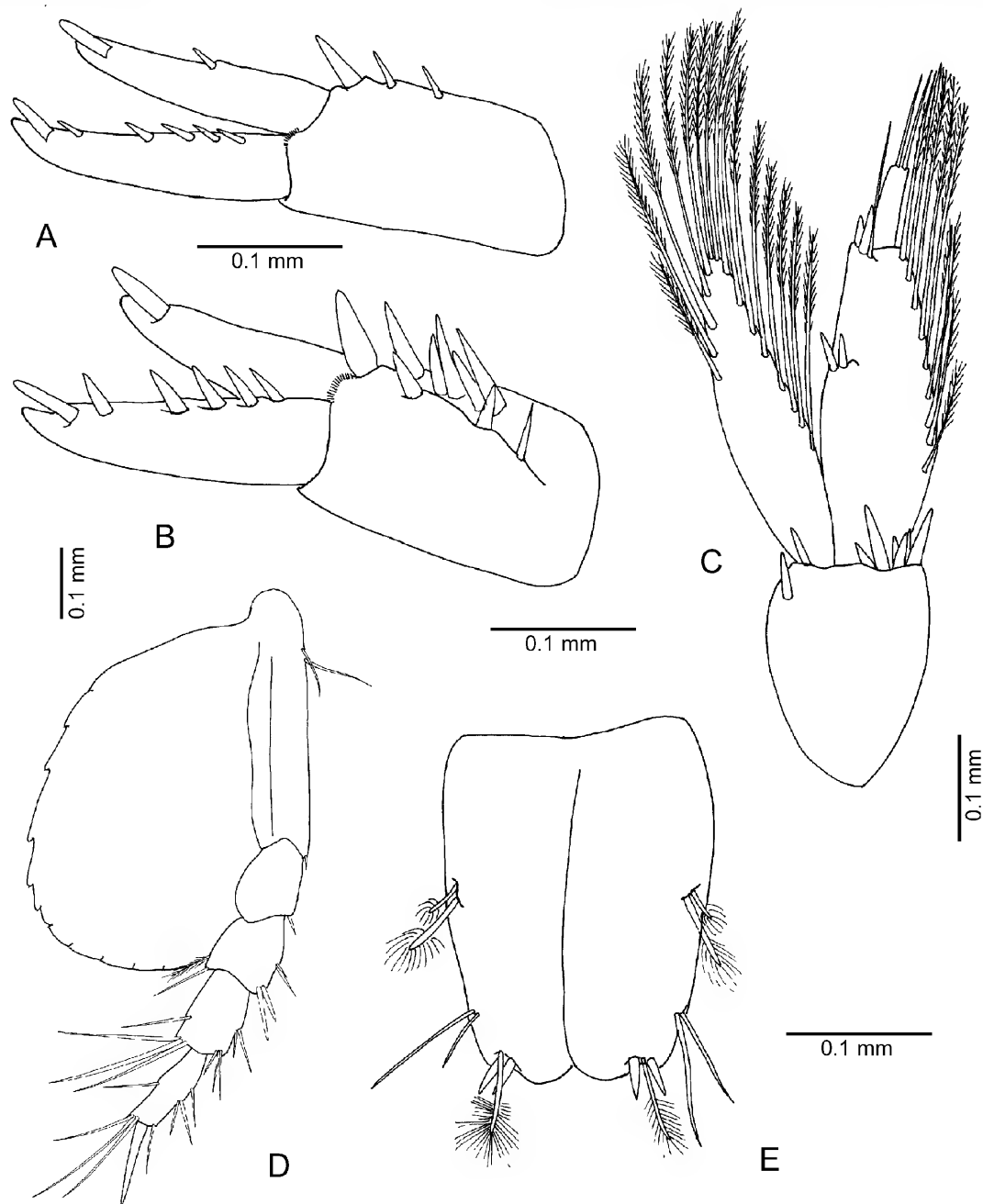


Fig.12- *Microphoxus uroserratus* sp.nov. Paratype MNRJ13524 (♂ -3.5mm): (A) uropod 1; (B) uropod 2; (C) uropod 3; (D) pereopod 7; (E) telson.

article 4 on antenna 2; a greater number of spines in uropods 1-2; uropods with serrate apicolateral corners; a setose telson; a longer rostrum; and a broader hook. It differs from *M. cornutus* by the lack of a displaced spine on peduncle of uropod 1; the right lacinia mobilis reduced; the left lacinia mobilis with two teeth; a smaller article 5 of pereopod 5; a setose telson; a longer rostrum; a broader hook; and a great number of facial setae on epimeron 3. It differs from *M. breviramus* sp.nov. by longer rami of uropods 1-2; less spines on article 4 of antenna 2; the coxa 1 with posteroventral setae; the left lacinia mobilis with two teeth; a slender hook; an elonged rostrum; and a great number of facial setae on epimeron 3.

Microphoxus moraesii sp.nov.
(Figs.13-18)

Material examined – Holotype: MNRJ9866-1♀ (2.3mm - dissected and drawing), Praia do Forno, Arraial do Cabo, RIO DE JANEIRO, BRAZIL, 23°03'S-42°02'W, Aviso Pesqueiro Suboficial Oliveira and F.C.Fernandes cols., 13/VII/1989, 5m. Paratypes: MNRJ13525-19♀ (1.2-2.1mm) *ibid.* MNRJ9868-20♀ e 4♂ (1.1-2.2mm, 1♂ -dissected and drawing), *ibid.*, 19/X/1989, 10m.

Diagnosis – Rostrum not reaching apex of article 1 on antenna 1. Article 4 of antenna 2 with 3 groups of setae on ventral margin. Rami of uropod 1 slightly smaller than peduncle. Inner ramus of uropod 2 smaller than peduncle. Peduncle of uropod 1 without displaced spine; inner ramus with 1 dorsal spine. Peduncle of uropod 2 with dorsal spines; inner ramus without dorsal spines. Outer ramus of article 2 on uropod 3 with 2 long simple setae; inner ramus with 1 seta. Epimeron 3 with 3 simple facial setae in row. Urosomite 3 with dorsal hook. Telson with 1 long simple dorsolateral seta.

Description of female – Head about 16% of total body length (Fig.13A), greatest width about 80% of length in dorsal view (Fig.13B). Rostrum constricted, narrow, short, smaller than article 1 of antenna 1 (Fig.13B). Eyes small, rounded, orange with rounded ommatidia. Article 1 of peduncle on antenna 1 (Fig.13C) as wide as long about 1.8 times as wide as article 2; ventral margin with 3 plumose setules; dorsal apex slightly produced, with 1 long simple seta. Article 2 of peduncle slightly smaller than article 1; article 2 with 5 long simple ventroproximal setae, 1 plumose ventrodistal setule and 2 apicodorsal setules; primary flagellum with 6 articles, 3-4 short aesthetasc each on, about 0.5 times as long as peduncle; accessory flagellum with 5 articles, 3-4 aesthetasc each on. Facial spine formula of article 4 on antenna 2 (Fig.13D) equal 1-3-3-2, medium and short thick spines; dorsal margin with 5 long and

medium simple distal setae, notch bearing 1 long simple seta and 1 spine, ventral margin with 3 groups of 2-3 long to short simple setae, 1 medium distal spine and 3 long pectinate setae; article 5 about 0.8 times as long as article 4, with 1 facial spine, dorsal margin with 1 short simple seta and 2 simple distal setules; flagellum with 8 articles, article 1 elonged, 3-4 aesthetasc each on, about 0.9 times as long as articles 4-5 of peduncle combined.

Epistome and upperlip distinctly articulate; outer lobes of lower lip (Fig.14F) with simple setules and with teeth on inner apical margin, inner lobes with simple setules. Mandibles with small palpar hump; right rakers 11, incisor with 2 teeth, lacinia mobilis reduced (Fig.14D); left rakers 10, incisor with 3 teeth, lacinia mobilis with 3 teeth (Fig.14E). Molars composed of short protrusions with spines; with 6 short spines. Palp article 1 short; article 2 with 1 short simple midventral seta, 1 short simple apicoventral seta; article 3 about 1.4 times as long as article 2, oblique apex with 7 long to medium simple setae. Inner plate of maxilla 1 (Fig.14A) with 4 short plumose setae; palp article 2 with 1 spine and 1 medium simple apicomedial seta, 4 medium simple submarginal setae. Maxilla 2 (Fig.14B) thin, plates extending subequally; outer plate slightly longer than inner, with 2 medium simple apicolateral setae and several medium simple apical setae; inner plate with 3 medium simple medial setae and several medium simple apical setae. Inner plate of maxilliped (Fig.14C) with 2 thick apicomedial spines, 3 medium simple apicofacial setae and 2 long simple medial setae; outer plate with 2 apical spines, 2 medium simple apical setae and 4 long simple medial setae; palp article 1 with 1 long simple apicolateral seta; article 2 with 1 long simple apicolateral seta, without lateral setae, inner margin with long to short simple setae; article 3 not produced, without facial setae, 2 medium simple lateral setae, 4 long to short simple apical setae, inner margin with 4 long simple setae; article 4 with 1 simple apicoventral setule, spine well developed and 1 simple accessory setule.

Gnathopods similar, width of articles 5-6 on gnathopods 1-2 (Figs.15A, B) equal 1-1.2 and 1-1.1, length equal 2.4-2.0 and 2.1-2.0; palmar humps slightly enlarged, palms almost transverse; article 5 of gnathopod 1 with posterior margin rounded, with long and medium simple setae, article 5 of gnathopod 2 elonged, ovate, posterior margin rounded with long to medium simple setae; rectangular propods with simple dorsal setae. Pereopods 3-4 similar; article 4 of pereopod 3 (Fig.15C) with 5 long simple facial setae and article 5 with 6 long simple facial setae; article 4 of

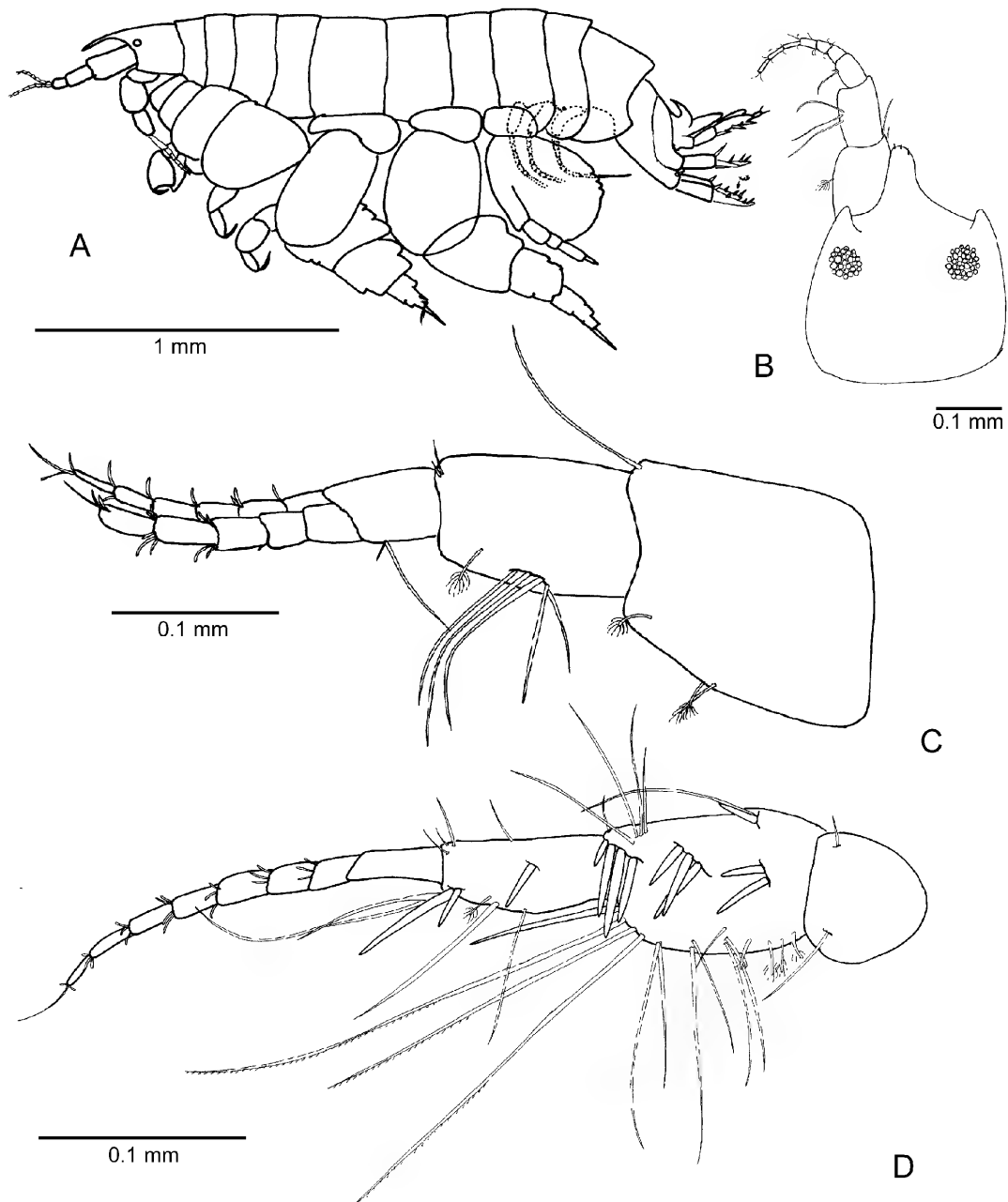


Fig.13- *Microphoxus moraesii* sp.nov. Holotype MNRJ9866 (♀ -2.3mm): (A) lateral view; (B) head; (C) antenna 1; (D) antenna 2.

pereopod 4 (Fig.15D) with 5 facial setae, article 5 with 4 facial setae, no posteroproximal spines; main spine of article 5 almost reaching the apex of article 6; spine formula of article 6 on pereopods 3-4 equal 5+5 and 5+4, some spines specially long; weak acclivity on inner margin of dactyls. Article 2 of pereopod 5 (Fig.15E) without facial ridge; article 4 broad, with facial spine rows; width on articles 2-4-5-6 equal 0.3-0.3-0.3-0.1; length equal 0.6-0.2-0.2-0.2. Article 2 of pereopod 6 (Fig.15F) without facial ridge; article 4 broad, without row of facial spine; width on articles 2-4-5-6 equal 0.4-0.4-0.2-

0.1; length equal 0.5-0.4-0.2-0.2. Article 2 of pereopod 7 (Fig.15G) with facial ridge; article 2 reaching apex of article 5, posterior margin with 6 teeth and simple setules; width on article 3 like other; width on articles 2-4-5-6 equal 0.2-0.2-0.1-0.06; length equal 0.6-0.2-0.2-0.2.

Main ventral setae of coxae 1-4 equal 16-7-6-5, long simple setae; coxa 1 (Fig.16A) weakly expanded apically, anterior margin straight, anterior setae longer than posterior; coxae 2-3 (Figs.16B, C) with anterior setae smaller than posterior; coxa 4 (Fig.16D) with posterior setae smaller than anterior,

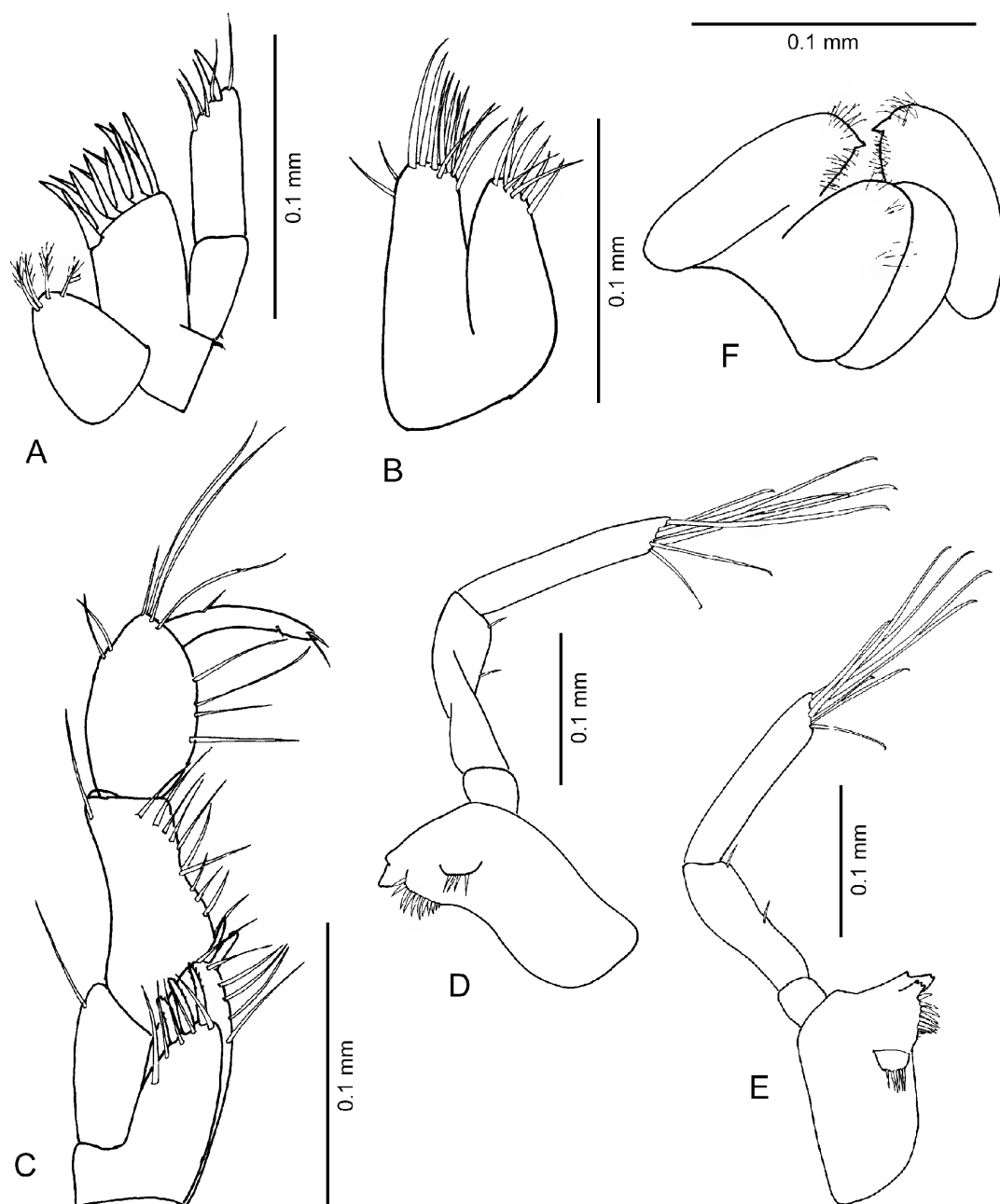


Fig.14- *Microphoxus moraesi* sp.nov. Holotype MNRJ9866 (♀ -2.3mm): (A) maxilla 1; (B) maxilla 2; (C) maxilliped; (D) right mandible; (E) left mandible; (F) lower lip.

anterior and posterior margins divergents, posterior margin almost straight, posterodorsal corner rounded, width-length equal 0.4-0.5. Posteroventral setal formula of coxae 5-7 (Figs.16E, F, G) equal 2-5-0; medium and short plumose setae. Epimeron 1 (Fig.16L) with posteroventral margin rounded, without setae; posterior margin straight, without setae; anteroventral margin with 1 medium simple seta. Epimeron 2 (Fig.16L) with posteroventral margin rounded; posterior margin straight, with 1 medium simple seta; ventral margin with 8 long plumose subfacial setae. Epimeron 3 (Fig.16L) with

posteroventral margin rounded, with 4 long simple facial setae, 2 in pair; posterior margin concave, with 2 long simple setae; ventral margin with 1 seta; posterior margin with 2 setae. Rami of uropod 1 (Fig.16H) slightly smaller than peduncle, no apical spines; outer ramus with 1 subapical spine, 1 dorsal spine; inner ramus with 2 subapical spines, 1 dorsal spine; peduncle without basofacial setae, with 1 large apicomedial spine, 1 apicolateral spine; apicolateral corner with comb. Inner ramus of uropod 2 (Fig.16I) smaller than peduncle, no apical spines; outer ramus with 1 dorsal spine, 1 subapical spine; inner

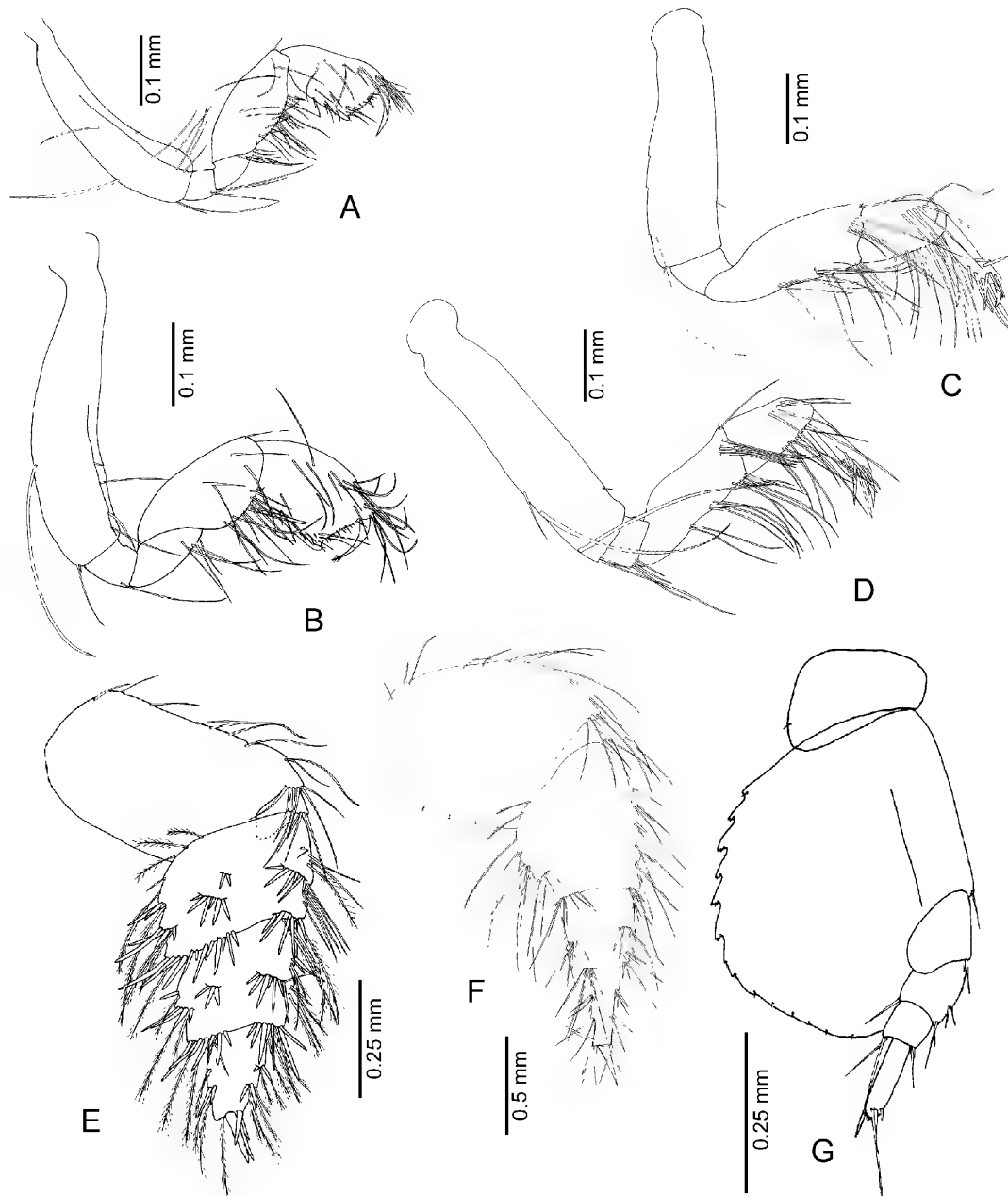


Fig.15- *Microphoxus moraesi* sp.nov. Holotype MNRJ9866 ♀ -2.3mm): (A) gnathopod 1; (B) gnathopod 2; (C) pereopod 3; (D) pereopod 4; (E) pereopod 5; (F) pereopod 6; (G) pereopod 7.

ramus with 1 dorsal spine, 2 subapical spines; peduncle with 2 dorsal spines, 1 long apicolateral spine; apicolateral corner with comb. Peduncle of uropod 3 (Fig.16J) with 3 ventral spines and 1 medial spine; width on inner ramus slightly smaller than article 1 of outer ramus, apex with 1 long simple seta, medial and lateral margins smooth; article 1 of outer ramus without seta on apicomedial margin, lateral margin with 2 activities, spine formula equal 2-2-2, no setae; article 2 elonged, with 2 long simple setae. Telson (Fig.16K) slightly elonged, length-width equal 0.2-0.1, almost fully cleft, with 1 seta and 1 plumose lateral setule, apex

weakly excavate, rounded, 1 long simple dorsolateral seta, 2 spines and 2 long and medium plumose apical setae. Urosomite 1 without lateral setule at base of uropod 1, with 2 medium simple ventral setae. Urosomite 3 with hook dorsally on each side (Fig.13A).

Description of male – Rostrum narrower than in female (Fig.17B), elonged, not reaching middle of article 2 on antenna 1 (Fig.17A). Article 2 of antenna 1 (Fig.17C) with 5 long and medium bipectinate ventral setae; primary flagellum with 7 articles, 3-4 aesthetasc each on, articles 1-3 with 1 calceolus;

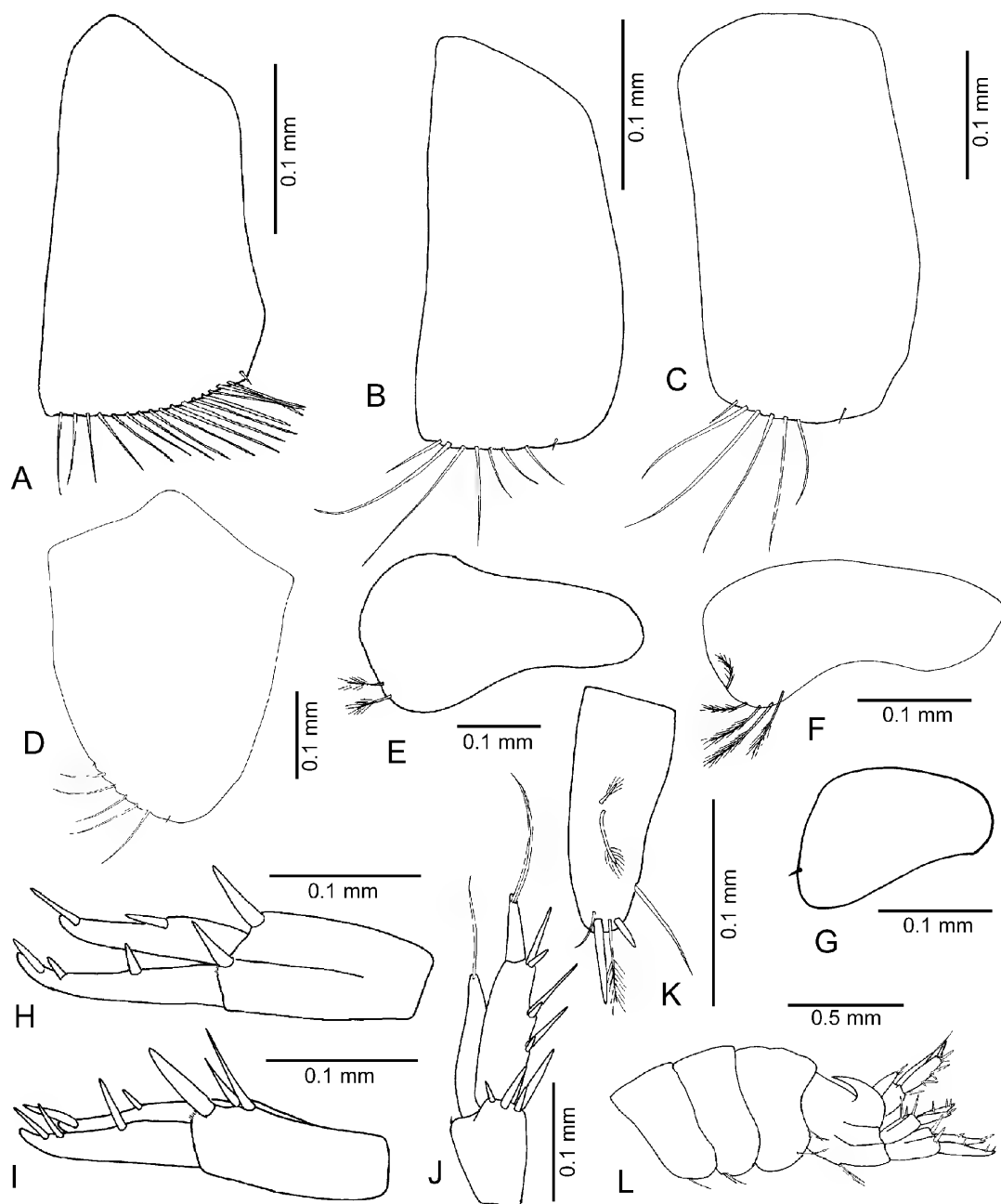


Fig.16- *Microphoxus moraesii* sp.nov. Holotype MNRJ9866 (♀ -2.3mm); (A) coxa 1; (B) coxa 2; (C) coxa 3; (D) coxa 4; (E) coxa 5; (F) coxa 6; (G) coxa 7; (H) uropod 1; (I) uropod 2; (J) uropod 3; (K) telson; (L) abdomen.

accessory flagellum with 5 articles, 5-6 aesthetasc each on. Facial spine formula of article 4 on antenna 2 (Fig.17D) equal 1-2-4-3; article 5 with 2 facial spines, 3 sets of short simple dorsal setae, 1 distal calceolus; ventrodiscal margin with 3 medium simple setae; ventral margin with 2 medium simple setae. Palp article 2 of maxilla 1 with 2 apicomedial spines, 3 submarginal setae and 1 apical seta. Inner plate of maxilla 2 with 3 medium simple medial setae; outer plate with 3 long simple apicolateral setae. Right rakers 12, molar with 7 spines; left rakers 7, molar

with 4 spines; article 3 of mandibular palp with 2 long simple basofacial setae, oblique apex with 8 long and medium simple setae. Gnathopods 1-2 similar, article 2 with long simple posterior setae; width on articles 5-6 of gnathopods 1-2 equal 0.1-0.2, length equal 0.4-0.3; palms almost transverse with long and medium simple setae; article 5 elonged, ovate, posterior margin rounded, with long and medium simple setae. Article 2 of pereopod 3 bearing 1 long simple anterodistal seta; article 4 with 5 long simple facial setae; article 5 with 5 long simple facial setae;

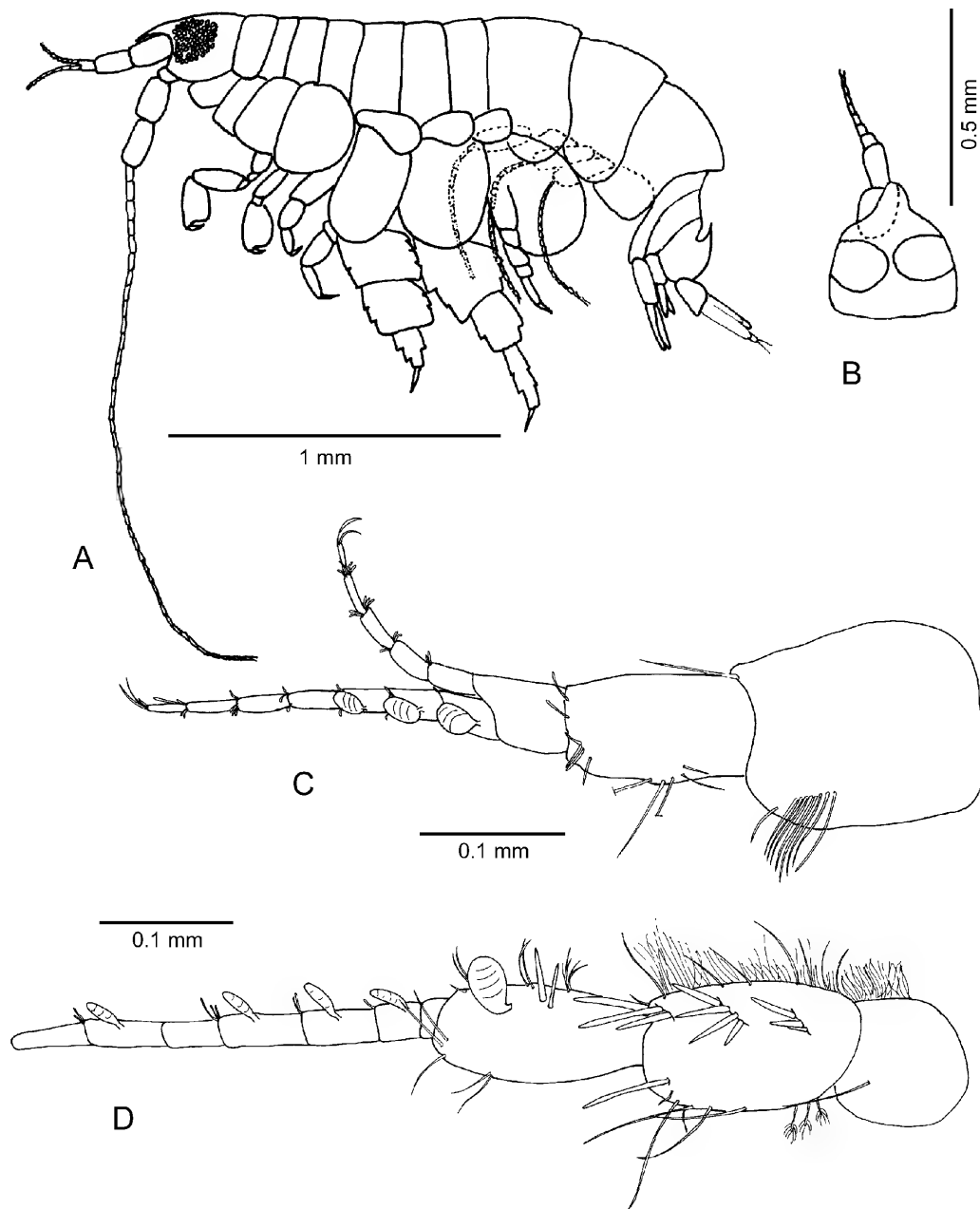


Fig.17- *Microphoxus moraesi* sp.nov. Paratype MNRJ9868 (♂ -2.2mm): (A) lateral view; (B) head; (C) antenna 1; (D) antenna 2.

facial spine formula on article 6 equal 5+6. Article 2 of pereopod 4 bearing 2 long simple setae and 4 long and medium simple posterodistal setae; article 4 with 6 long simple facial setae; article 5 with 5 long simple facial setae; facial spine formula on article 6 equal 5+6. Article 2 of pereopod 5 with facial ridge; article 4 broad, with facial spines rows; width on articles 2-4-5-6 equal 0.4-0.4-0.3-0.1, length equal 0.7-0.3-0.4-0.4. Pereopods 6 like female. Article 5 of pereopod 7 (Fig.18D) without posteroventral spine. Epimera 1-3 broad; epimeron 1 with 16 anteroventral setae; epimeron 2 with 7 facial setae and 4 posterior setae; epimeron 3 with

2 facial spines, 1 ventral seta, 6 posterior setae. Urosome elonged, narrow, articulation line defined. Telson (Fig.18E) elonged, length-width equal 3.5-3.0, almost fully cleft, with 1 plumose lateral setule, apex weakly excavate, rounded, 2 long simple dorsolateral setae, 2 midapical spines. Rami of uropod 1 (Fig.18A) longer than peduncle; outer ramus with 1 dorsal spine, 1 accessory spine; inner ramus with 1 dorsal spine, 2 subapical spines; peduncle without basofacial setae, with 1 thick apicomedial spine, 1 apicolateral spine; apicolateral corner without comb. Outer ramus of uropod 2 (Fig.18B) smaller than peduncle, with 1 subapical

spine, 1 dorsal spine; inner ramus longer than peduncle, no apical spines, with 1 dorsal spine, 2 subapical spines; peduncle with 4 dorsal spines, 1 large apicomedial spine, 1 large apicolateral spine; apicolateral corner without comb. Peduncle of uropod 3 (Fig.18C) bearing 3 ventral spines, 1 dorsal spine, 1 medial spine; inner ramus as long as article 1 of outer ramus; medial and lateral margins with long plumose setae, outer ramus with 2 activities on lateral margin, spine formula equal 1-2-2, setal formula equal 0-0-1.

Etymology – In tribute to biologist Décio Ferreira de Moraes Jr., from Museu Nacional-Rio de Janeiro.

Variations – Studied specimens showed no significant variations.

Remarks – *Microphoxus moraes* differ from *M. cornutus*, mainly by: the shape of the rostrum; the peduncle of uropod 1 without a displaced spine; no facial spines on epimeron 3 and the facial spine formula of article 4 on antenna 2. It differs from *M. breviramus* sp.nov. by: specially the shape of rostrum; the epimeron 3 without facial spines; the shape and standard of the spines on the uropods and the facial spine formula of article 4 on antenna 2. It differs from *M. uroserratus* sp.nov. by: specially the shape of rostrum; the shape of the hook; the

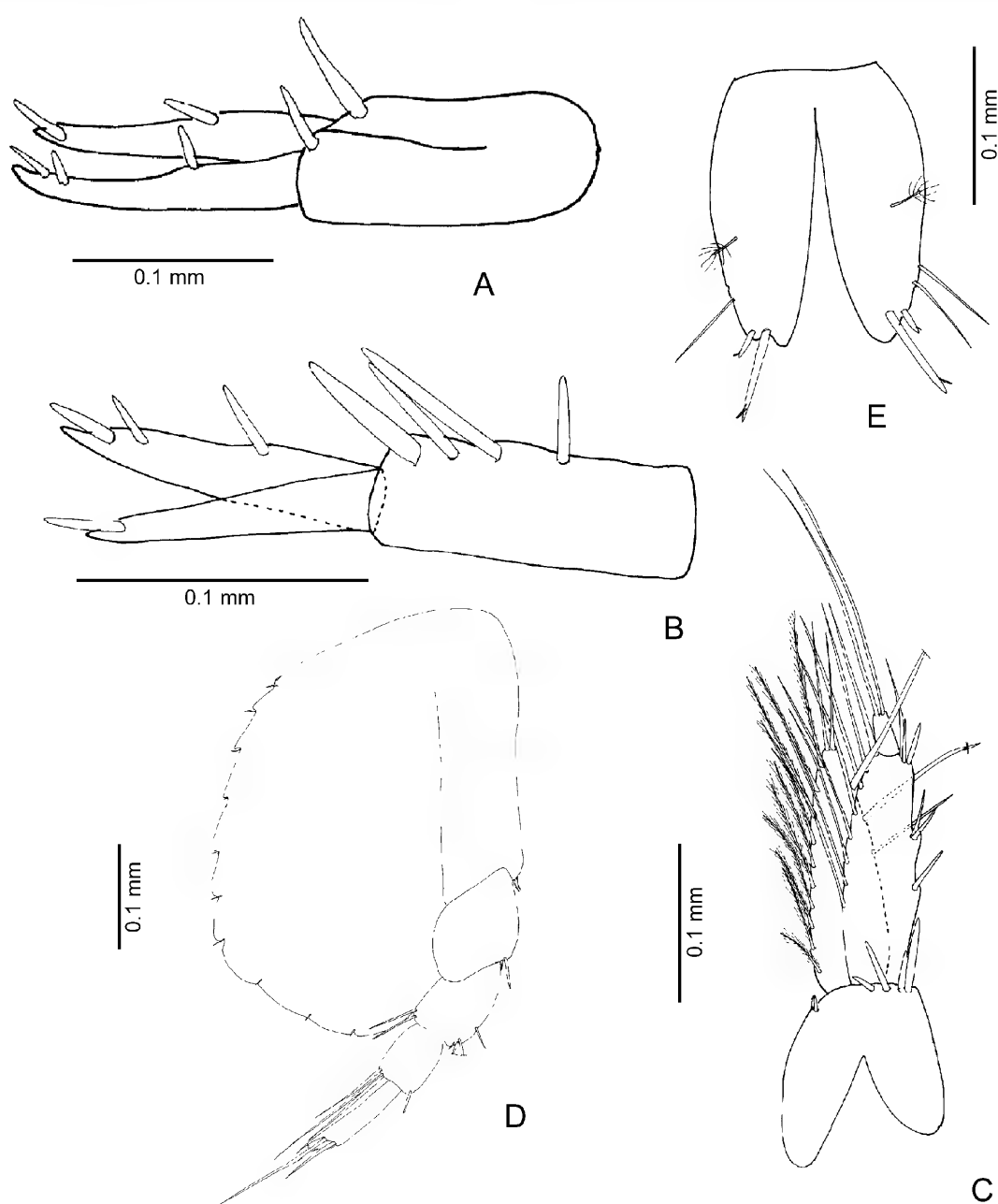


Fig.18- *Microphoxus moraes* sp.nov. Paratype MNRJ9868 (♂ -2.2mm): (A) uropod 1; (B) uropod 2; (C) uropod 3; (D) pereopod 7; (E) telson.

facial spine formula of article 4 on antenna 2 and the standard of the spines on uropods. It is similar to *M. minimus*, but differs from this species by: article 2 of pereopod 7 with more teeth; the article 4 of antenna 2 with 4 groups of spines; the setose telson; the great number of articles of flagellum on antenna 1; the dorsal notch of article 4 on antenna 2 with 1 seta and 1 spine; the ventral margin of article 4 on antenna 2 setose; the right lacinia mobilis reduced; the inner plate of maxilla 1 with 2 setae; three inner ramus of uropod 3 with 1 seta and the outer ramus of uropod 2 with 1 dorsal spine.

Ammend – ventral setae on article 2 of antenna 1 no widely spread, right mandibular incisor with 2-3 teeth and propod of gnathopods least or very setose on anterior margin.

KEY TO THE SPECIES OF *MICROPHOXUS* FROM BRASIL

- 1- Rostrum short, not reaching article 1 of antenna 1... 2
Rostrum elonged, extending article 1 of antenna 1 ... 3
- 2- Inner plate of maxilla 1 with 2 setae, article 4 of antenna 2 with 3 spine groups; inner ramus of uropod 3 with 2 setae *M. minimus* Barnard, 1960
Inner plate of maxilla 1 with 4 setae, article 4 of antenna 2 with 4 spine groups; inner ramus of uropod 3 with 1 seta *M. moraesii* sp.nov.
- 3- Peduncle of uropod 1 with displaced spine
..... *M. cornutus* (Schellenberg, 1931)
Peduncle of uropod 1 without displaced spine 4
- 4- Rami of uropods 1-2 smaller than peduncle; coxa 1 without posteroventral setae; lacinia mobilis with 4 teeth *M. breviramis* sp.nov.
Rami of uropods 1-2 longer than peduncle; coxa 1 with posteroventral setae; lacinia mobilis with 2 teeth *M. uroserratus* sp.nov.

ACKNOWLEDGMENTS

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RESUMO

TRÊS ESPÉCIES NOVAS DE
MICROPHOXUS BARNARD, 1960
(AMPHIPODA, PHOXOCEPHALIDAE, METHARPINIINAE)
NO LITORAL DO RIO DE JANEIRO, BRASIL

O presente trabalho amplia a distribuição do gênero *Microphoxus* Barnard, 1960 no litoral do Brasil e duplica o número de espécies conhecidas. Três novas espécies são descritas para Arraial do Cabo e Baía de Sepetiba, no litoral do Rio de Janeiro, Brasil. A diagnose do gênero é emendada e é apresentada uma chave dicotômica para identificação das espécies conhecidas.

Palavras-chave: Taxonomia, Amphipoda, Phoxocephalidae, *Microphoxus*, Brasil, Rio de Janeiro.

ABSTRACT

The present work expand the distribution of *Microphoxus* Barnard, 1960 along the Brazilian coast and duplicates the number of species known locally. Three new species are described from Arraial do Cabo and Sepetiba Bay, on the coast of Rio de Janeiro, Brazil. The generic diagnosis is ammended and an identification key is given for the know species.

Key words: Taxonomy, Amphipoda, Phoxocephalidae, *Microphoxus*, Brazil, Rio de Janeiro.

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NEPHROPIDAE (CRUSTACEA, DECAPODA) COLLECTED BY THE
REVIZEE SCORE-CENTRAL PROGRAM
FROM OFF BAHIA TO RIO DE JANEIRO STATES, BRAZIL ⁽¹⁾

(With 9 figures)

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The family Nephropidae is composed by macrourus crustaceans, varying from 100 to 1200mm in length, and living in depths between 200 and 2000m. All the species are bottom-dwelling, especially on rocky bottoms, where they can hide and shelter, but they also can occur on open sand or mud bottoms (HOLTHUIS, 1991).

Three genera of Nephropidae are recorded from Brazil: *Acanthacaris*, *Metanephrops* and *Nephropsis*. MOREIRA (1903) described *Nephrops rubellus* (= *Metanephrops*) from off Rio de Janeiro, 30–35 miles offshore, 43° to 43.5°W, depth 60 to 100m. HOLTHUIS (1974) reviewed the Atlantic species of Nephropidae, and recorded *Nephropsis agassizi* A. Milne Edwards, 1880 and *M. rubellus* (Moreira, 1903) from Brazil. MELO (1999) added *Acanthacaris caeca* (A. Milne Edwards, 1881), *Nephropsis aculeata* Smith, 1881 from Brazil, and included the geographic distribution of the four species presently known.

This study describes five species of Nephropidae collected during the Revizee Score-Central Program and discusses the geographic distribution of the species of this family in the Atlantic Ocean.

MATERIAL AND METHODS

The material studied herein was collected during June and July of 1999 and 2000 by the Oceanographic Research Vessel 'Thalassa' for the Revizee Score-Central Program along the Brazilian coast of Bahia, Espírito Santo and Rio de Janeiro states (13° to 21°S) and from depths between 200 and 2200m. The specimens are deposited in the Crustacean collection of the Museu Nacional, Rio de Janeiro, Brazil.

SYSTEMATIC DESCRIPTIONS

Family Nephropidae Dana, 1852
Genus *Nephropsis* Wood-Mason, 1873
Nephropsis aculeata Smith, 1881
(Figs.1-2)

Nephropsis aculeata Smith, 1881:431; HOLTHUIS, 1974 [1975]:776, figs.15-16; 1991:13; MELO, 1999:484, fig.324; TAKEDA, 1983:82.

Material examined – Revizee Score-Central Program. E0541, 21°10.040'S, 40°13.601'W, 545–579m, 1♂ (cl: 48.0mm), MNRJ 14222; D0464, 21°48.496'S, 40°01.539'W, 592–618m, 2♀ (not ovigerous) (cl: 55.8 to 63.5mm), MNRJ 13732.

Diagnosis – Rostrum with one pair of lateral spines. Carapace with subdorsal carinae without granules or spines; without postsupraorbital spine. Abdominal pleura without anterior spines. Abdominal tergum with a small median carina. Uropod with exopod with a diaeresis.

Description – Rostrum long, setose, curved slightly upward, with median carinae and one pair of lateral spines, first one on middle length and second between first and base, first one larger than second (Figs.1a, b). Carapace with one antennal spine, one supraorbital spine and one triangular subdorsal carinae without granules or spines. Postcervical groove distinct from cervical and hepatic grooves (Figs.1a, b). Distance between supraorbital spine and gastric tubercle less than half of distance between this last one and postcervical groove (Fig.1b). Antennae 1 with peduncle shorter than rostrum and a little more than half of flagella length. Antennae 2 with peduncle shorter than that of antennae 1, and flagella longer than body length.

All maxillipeds with exopods and epipods. First three pairs of pereopods chelate, the other two ambulatorial. First pereopod very setose and with carpus with three to four spines and merus with two spines. Carpus longer than palm on second pereopod. Carpus longer than half of chela on third pereopod.

Abdomen with six pairs of pleopods, first one uniramous, small in females and large in males; other pleopods biramous. Pleurae very setose, without spines on anterior margin, ending in sharp point (Fig.1c). Tergum with a little median carina from second to sixth somites. Uropods with one pair of spines and posterior margin of endopods and exopods setose. Exopod of uropod with a diaeresis. Telson rectangular with one pair of spines and posterior margin setose.

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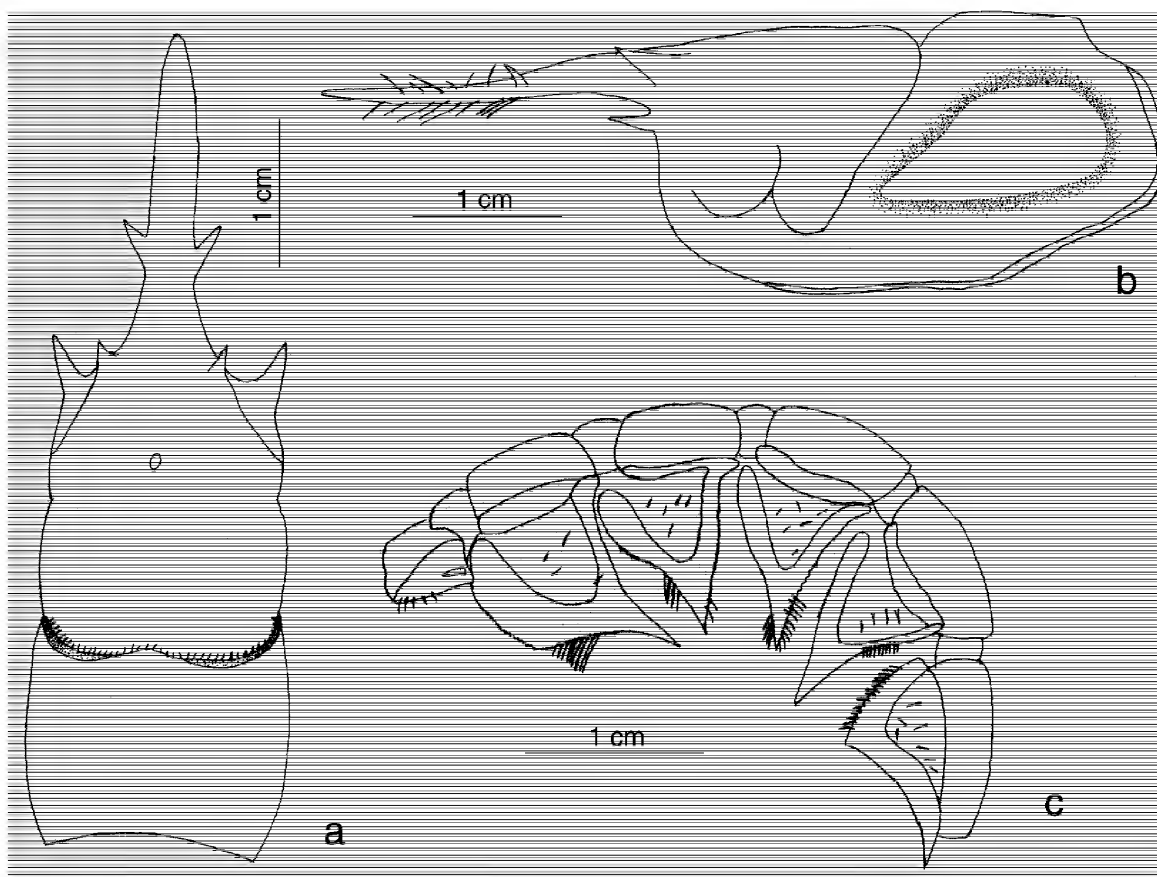


Fig.1- *Nephropsis aculeata* Smith, 1881: (a) carapace, dorsal view; (b) carapace, lateral, view; (c) abdomen, lateral view.

Remarks – HOLTHUIS (1974) redescribed *N. aculeata* and most of his observations agree with those from the Brazilian specimens, except by the number of spines on the carpus of first pereopod and the length of carpus of the second pereopod. The Brazilian specimens presented 3 to 4 spines on the carpus instead of only 3 referred by HOLTHUIS (1974) and the carpus of the second pereopod was a little smaller than the palm instead of longer than it. Furthermore, MELO (1999) described a conspicuous median carina on the tergum of the abdominal somites, but this carina was small in our specimens, occurring only from the second to sixth somites.

Of the three specimens sampled, two were female and one of these was ovigerous (July, 2000). HOLTHUIS (1974) recorded ovigerous females during the months of April, May, July, September, and December in the Caribbean Region.

Nephropsis aculeata was previously recorded from New Jersey to Guiana (HOLTHUIS, 1974) and, from Brazilian coast, only from Rio de Janeiro and São Paulo states (MELO, 1999). Therefore, there is a large gap in its distribution between 5°N and 23°S. The new records from Espírito Santo state decreases this gap, which probably is due only to the lack of dredgings from deep waters in Northeastern Brazil (Fig.2).

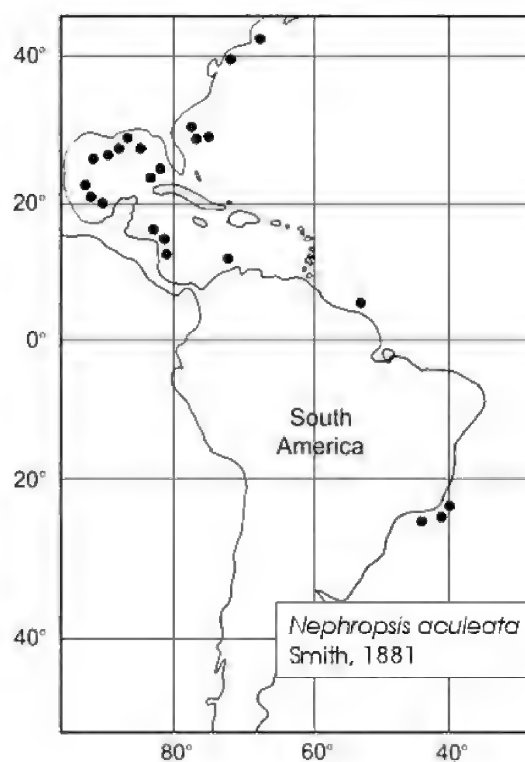


Fig.2- Geographic distribution of *Nephropsis aculeata* Smith, 1881.

Distribution – East of New Jersey to French Guyana, including the entire Gulf of Mexico and Caribbean sea; Brazil - Espírito Santo, Rio de Janeiro and São Paulo (HOLTHUIS, 1974; 1991; TAKEDA, 1983; MELO, 1999; new occurrences).

Nephropsis agassizi A. Milne Edwards, 1880
(Figs.3-4)

Nephropsis Agassizii A. Milne Edwards, 1880:1.

Nephropsis agassizii – HOLTHUIS, 1974 [1975]: 796, figs.19-20; 1991:15.

Nephropsis agassizi – MELO, 1999:486, fig.326.

Material examined: Revizee Score-Central Program. E0501, 14°16.764'S, 38°38.978'W, 1591-1709m, 2♀ (1 ovigerous) (cl: 36.4 to 37.7mm), 1♂ (cl: 45.6mm), MNRJ 14179; E0526, 20°03.984'S, 38°36.676'W, 1636-1649m, 2♀ (not ovigerous) (cl: 28.2 to 40.7mm), 1♂ (cl: 37.7mm), MNRJ 14224; E0525, 20°07.308'S, 38°42.906'W, 1614-1680m, 1♀ (not ovigerous) (cl: 27.3mm), MNRJ 14225; E0537, 20°23.542'S, 39°38.943'W, 1522-1567m, 2♀ (not ovigerous) (cl:

44.8-58.1mm), MNRJ 14221; E0552, 21°09.541'S, 39°46.079'W, 1686-1699m, 1♀ (not ovigerous) (cl: 32.9mm), 1♂ (cl: 26.4mm), MNRJ 14180.

Diagnosis – Rostrum with two pairs of lateral spines. Carapace with subdorsal carinae with spines; one postsupraorbital spine. Second abdominal pleura with at least one anterior spine. Abdominal tergum without a median carina. Uropod with exopod without a diaeresis.

Description – Rostrum curved slightly upward, long, setose, with two lateral spines, first one on middle length and second between first and base; first one larger than second (Figs.3a, b). Carapace with granules, with postcervical groove distinct of cervical and hepatic grooves; with one antennal spine, one supraorbital spine and posteriorly, one postsupraorbital spine. Subdorsal carinae triangular with two to five spines on each side (Figs.3a, b). Antennae 1, with peduncle shorter than rostrum and a little more than half of flagella length. Antennae 2 with peduncle shorter than that of antennae 1, flagella larger than body length.

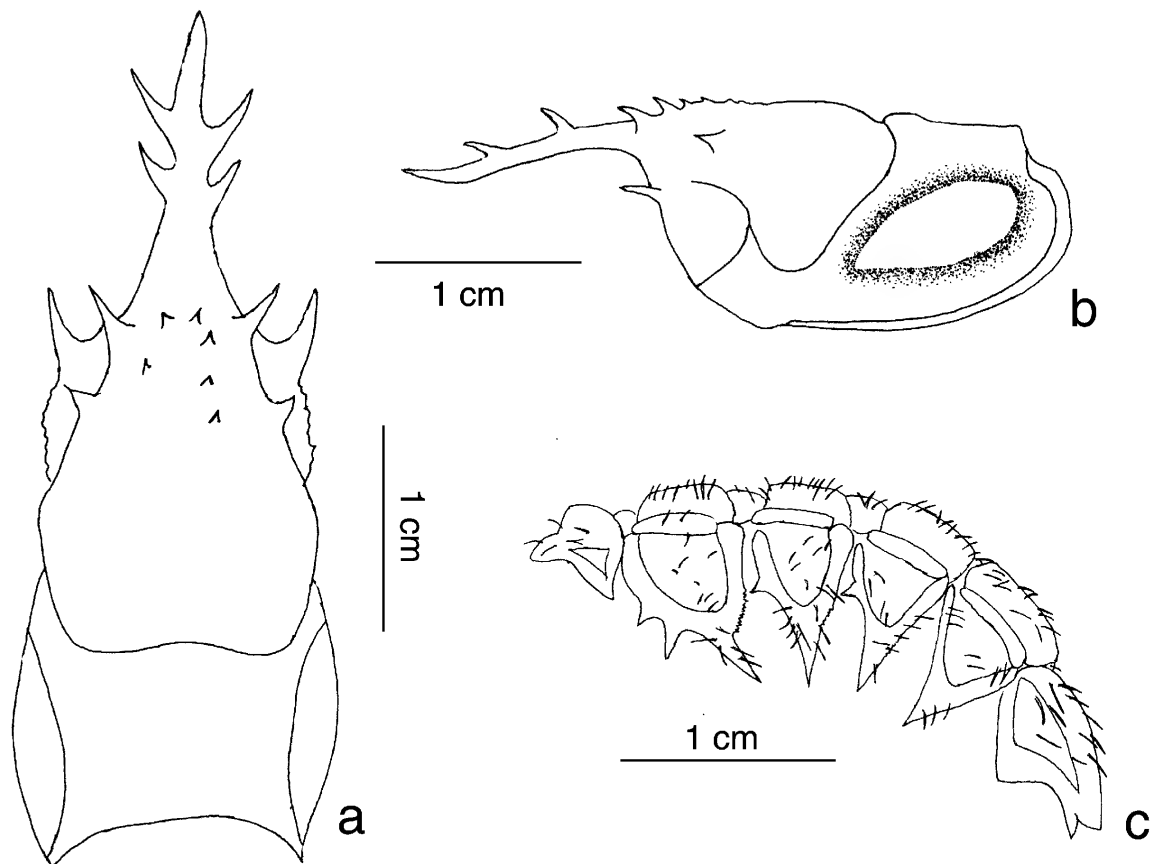


Fig.3- *Nephropsis agassizi* A. Milne-Edwards, 1880: (a) carapace, dorsal view; (b) carapace, lateral, view; (c) abdomen, lateral view.

All maxillipeds with exopods and epipods. First three pairs of pereopods chelate, the other two ambulatorial. First pair of pereopods very setose, carpus with four to seven spines and merus with two to nine spines. Second pair of pereopods with carpus about half of length of merus. Third pair of pereopods with carpus with less than half of length of chela.

Abdomen with six pairs of pleopods, first one uniramous, small in females and large in males; other pairs biramous. Uropods with endopods and exopods with a terminal spine and posterior margins setose. Pleurae sharply pointed; second, third and fourth ones with at least one spine on anterior margin (Fig.3c). Tergum with few setae and granules. Telson rectangular with one pair of terminal spines and posterior margin setose.

Remarks – Most specimens of *Nephropsis agassizi* presented the typical two pairs of spines on rostrum as described by HOLTHUIS (1974), but four specimens had different numbers of spines from one side to another, suggesting those were only abnormal growth: a female (E 0526) presented three spines on the right side; other female (E 0537) presented three spines on the left side; other female (E 0526) presented only one spine on the left side; and one male (E 0526) had three spines on the left side.

HOLTHUIS (1974) described the subdorsal carinae as granulated with tubercles but those observed were granulate and with spines; he also described five to six spines on the carpus and six spines on the merus of first pereopod which presented five to seven and six to nine, respectively, in Brazilian specimens.

Eleven specimens of *Nephropsis agassizi* were sampled, presenting a proportion of 0.3 males for each female. Only one female, collected in June 2000, among eight females, was ovigerous. HOLTHUIS (1974) recorded only one ovigerous female from February, 1973 from Bahamas Is.

Along the Brazilian coast, *Nephropsis agassizi* was only previously recorded from São Paulo (MELO, 1999) and the several samples examined herein enlarge its known distribution from Bahia to São Paulo (14° to 24°S). The absence of records of this species from northern Brazil is probably due to the lack of samples from this area (Fig.4).

Distribution – Bahamas, northern and eastern Gulf of Mexico, southern and eastern Caribbean Sea, Tobago, Brazil – Bahia, Espírito Santo, Rio de Janeiro and São Paulo (HOLTHUIS, 1974; 1991; MELO, 1999; new occurrences).

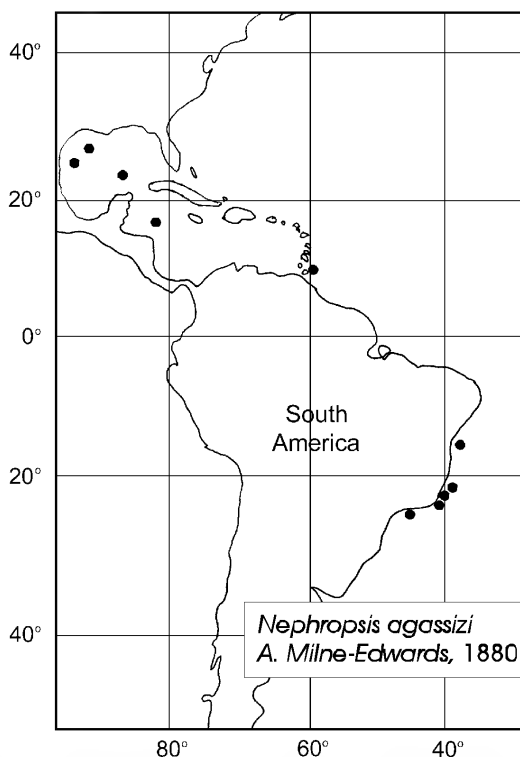


Fig.4- Geographic distribution of *Nephropsis agassizi* A. Milne-Edwards, 1880.

Nephropsis neglecta Holthuis, 1975 (Figs.5-6)

Nephropsis neglecta Holthuis, 1974 [1975]:792, fig.18; TAKEDA, 1983:83.

Material examined – Revizee Score-Central Program. D0503, 19°39.943'S, 38°38.435'W, 808m, 3 ovigerous ♀ (cl: 25.8 to 36.3mm), 7♂ (cl: 27.7 to 34.7mm), MNRJ 14098; D0506, 19°42.716'S, 38°36.497'W, 935m, 6♀ (3 ovigerous) (cl: 19.2 to 38.0mm), 5♂ (cl: 28.6 to 35.0mm), MNRJ 14096; D0504, 19°42.734'S, 38°38.156'W, 910m, 4♀ (3 ovigerous) (cl: 31.2 to 35.4mm), 6♂ (cl: 17.1 to 33.7mm), MNRJ 14095; D0505, 19°43.788'S, 38°38.156'W, 926-927m, 3♀ (1 ovigerous) (cl: 29.2 to 38.5mm), 1♂ (cl: 32.6 mm), MNRJ 14115.

Diagnosis – Rostrum with two pairs of lateral spines. Carapace with subdorsal carinae with granules and spines; with one postsupraorbital spine. Abdominal pleurae without anterior spines, but usually with granules. Abdominal tergum with a median line. Uropod with exopod with diaeresis.

Description – Rostrum slightly curved upward, long and setose, with a median carina, with two pairs of lateral spines; first one on middle length and second between first and base; first one larger than second (Figs.5a, b). Carapace with one antennal spine, one

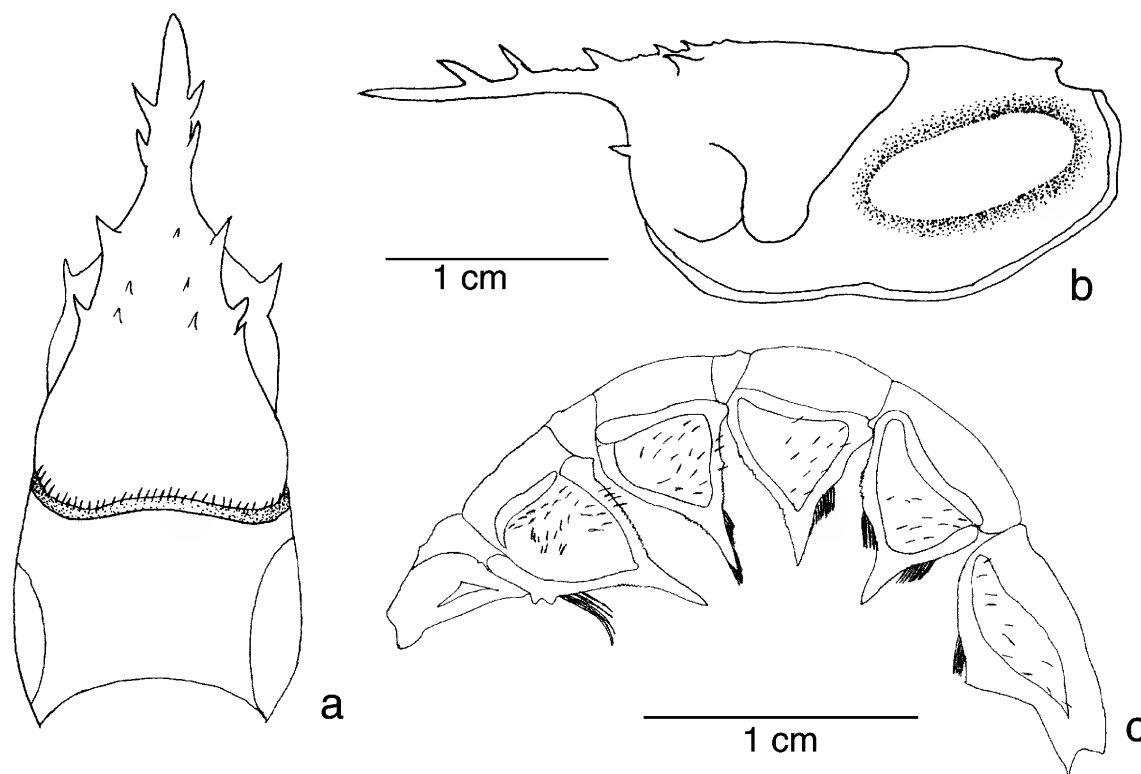


Fig.5- *Nephropsis neglecta* Holthuis, 1975: (a) carapace, dorsal view; (b) carapace, lateral, view; (c) abdomen, lateral view.

supraorbital spine and posteriorly, one postsupraorbital spine; subdorsal carinae triangular with two to six spines on each side (Fig.5a, b), with a gastric tubercle between the spines of the subdorsal carinae (Fig.5a). Postcervical groove distinct from the cervical and the hepatic grooves (Fig.5b). Antennae 1 with peduncle shorter than rostrum and a little more than half of flagella length. Antennae 2 with peduncle smaller than that from antennae 1 and longer than body length.

All maxillipeds with exopods and epipods. First three pairs of pereopods chelate, the other two ambulatorials. First pair of pereopods, larger than others, with carpus with four to six spines and merus with two to six spines.

Abdomen with six pairs of pleopods, first one uniramous, small in females and large in males; other pleopods biramous. Uropod biramous with one spine on outer surface and setose posterior margin. Exopod of uropod setose, with a conspicuous diaeresis, without spines or tubercles. First pleura usually with anterior margin with granules, without spines (Fig.5c). Pleurae ending in a sharp point (Fig.5c). Tergum with a median line from third to sixth somites. Telson rectangular, with a median line, one pair of spines and setose posterior margin.

Remarks – It was observed variation in the number of spines on the rostrum in *Nephropsis neglecta*,

which occurred in 3 specimens: one female (D 0505) did not present the anterior spine of the left side; one male (D 0503) had three spines on the right side; and one male (D 0504) presented three spines on each side.

HOLTHUIS (1974) and TAKEDA (1983) described a median carinae on tergum, but our specimens presented only a median line along the second to sixth somite; also both authors cited two spines on merus of first pair of pereopods, whereas in the Brazilian species this number varied from two to six. *Nephropsis neglecta* was the species of the Nephropidae most commonly sampled by the Revizee Program, represented by 35 specimens: 16 females and 19 males. Of these females, 10 (62%) were ovigerous, all from June 1999. Holthuis (1974) examined females ovigerous from Off Suriname, in July 1968.

The record of *Nephropsis neglecta* from the Brazilian coast (from Espírito Santo State) enlarges significantly the meridional distribution of this species, which was only known from the Northwestern Atlantic (HOLTHUIS, 1974) (Fig.6).

Distribution – Straits of Florida, Dry Tortugas, Lesser Antilles from Guadeloupe to Tobago, Caribbean Sea, N.E. and S. of Jamaica, Colombia and Venezuela, the Guianas, and Brazil - Espírito Santo (HOLTHUIS, 1974; TAKEDA, 1983; new occurrences).

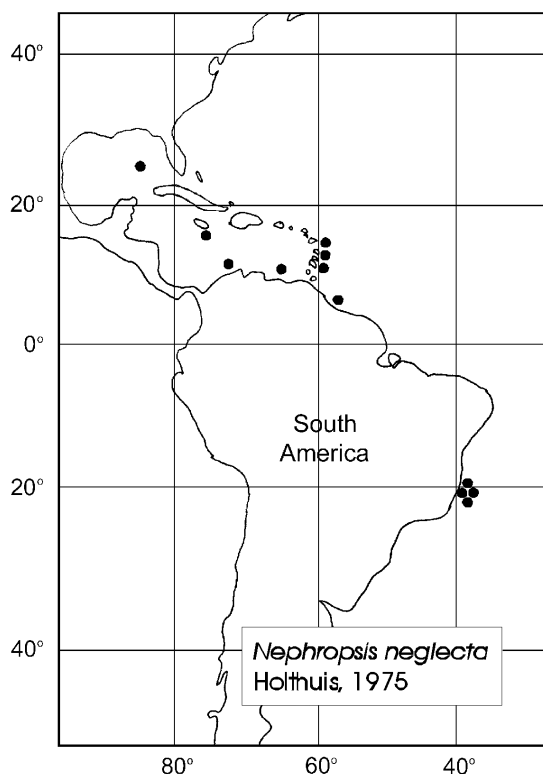


Fig.6- Geographic distribution of *Nephropsis neglecta* Holthuis, 1975.

Nephropsis rosea Bate, 1888

(Figs.7-8)

Nephropsis rosea Bate, 1888:178, fig.39, pl.23, figs.1-2, pl.24, fig.1; HOLTHUIS, 1974 [1975]:787, figs.16-17; TAKEDA, 1983:84.

Material examined – Revizee Score-Central Program. E0498, 13°08.058'S, 38°24.582'W, 614-620m, 1♂ (cl: 23.2mm), MNRJ 14223; E0510, 15°47.383'S, 38°36.154'W, 580-615m, 2♂ (cl: 54.0 to 59.1mm), MNRJ 14181; D0502, 19°37.488'S, 38°41.909'W, 665-706m, 8♀ (not ovigerous) (cl: 23.3 to 47.6mm), 6♂ (cl: 32.7 to 37.2mm) MNRJ 14097; D0503, 19°39.943'S, 38°38.435'W, 808m, 3♀ (not ovigerous) (cl: 24.0 to 38.3mm), 7♂ (cl: 20.3 to 48.0mm), MNRJ 14148.

Diagnosis – Rostrum with one pair of lateral spines. Carapace with subdorsal carinae with granules; with one postsupraorbital spine. Abdominal pleurae without anterior spines. Abdominal tergum with a median line. Uropod with exopod with a diaeresis.

Description – Rostrum, curved slightly upward, long, setose, with one pair of lateral spines near middle of

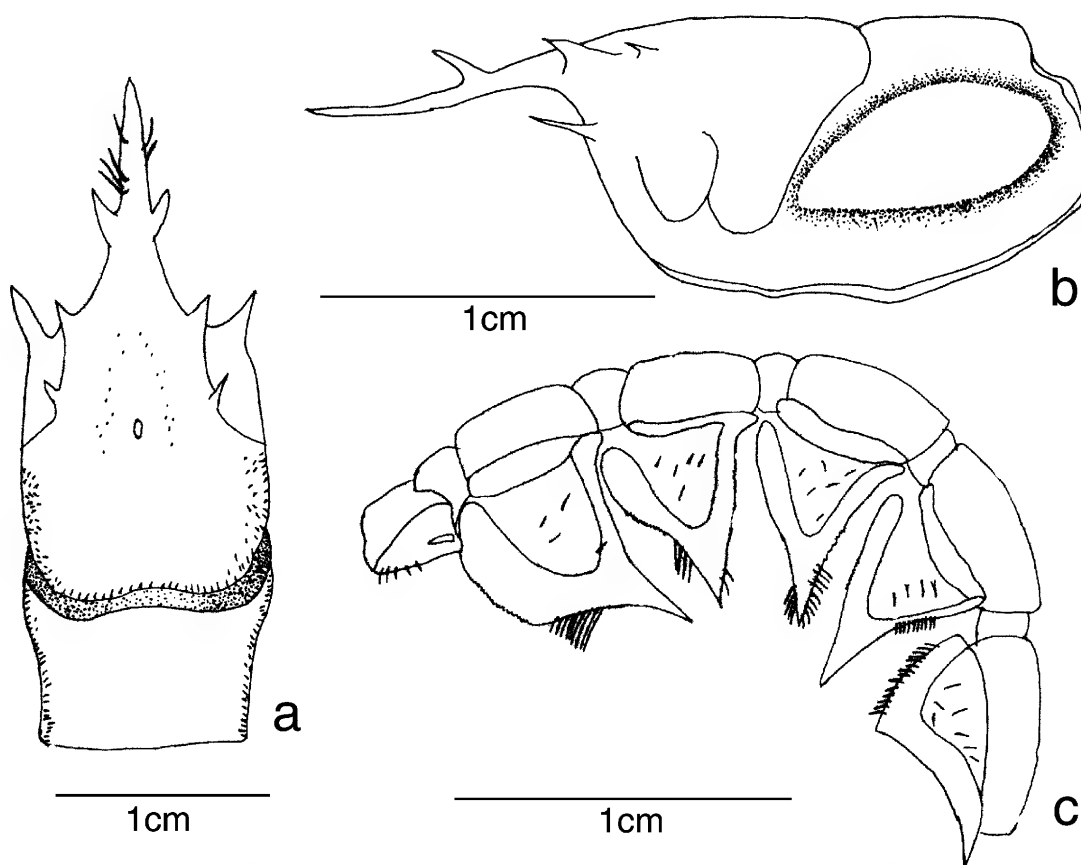


Fig.7- *Nephropsis rosea* Bate, 1888: (a) carapace, dorsal view; (b) carapace, lateral, view; (c) abdomen, lateral view.

length and with a median carina (Figs.7a, b). Carapace with many granules, with postcervical groove distinct of the cervical and hepatic grooves; with one antennal spine, one supraorbital spine and posteriorly, one small postsupraorbital spine. Subdorsal carinae triangular with many granules and with one gastric tubercle (Figs.7a, b). Distance between supraorbital spine and gastric tubercle half or more than half of distance between gastric tubercle and postcervical groove (Fig.7b). Antennae 1 with peduncle shorter than rostrum and a little longer than half of flagella length. Antennae 2 with peduncle shorter than that of antennae 1, and with flagella longer than body length.

All maxillipeds with exopods and epipods. First three pairs of pereopods chelate, the other two ambulatorial. First pair of pereopods longer than others, with three to five spines on carpus and two spines on merus. Second pair of pereopods with carpus shorter than palm, and third pair with carpus with almost half-length of chela.

Abdomen with six pairs of pleopods, first one uniramous, small in females and large in males; other pleopods biramous. Uropods with one pair of spines and setose posterior margin. Pleurae without spines on anterior margin, ending in sharp point (Fig.7c). Tergum with median line from second to sixth somites. Telson rectangular with one pair of spines and setose posterior margin.

Remarks – HOLTHUIS (1974) described four to five spines on carpus of the first pereopod, but this number varied from three to five spines in the examined specimens. TAKEDA (1983) observed a granule or a small tubercle in postsupraorbital position, which in our specimens were substituted by a small spine.

Nephropsis rosea was represented by 27 specimens: 11 females and 16 males. None of the females were ovigerous. HOLTHUIS (1974) recorded only one ovigerous female from off Nicaragua in May, 1962.

The records of *Nephropsis rosea* from the Brazilian coast, from Bahia and Espírito Santo states, enlarge significantly its known meridional distribution, since it was only known from the Northwestern Atlantic (HOLTHUIS, 1974) (Fig.8).

Distribution – Western Atlantic, between Bermudas and French Guyana, including Bahamas Islands, Gulf of Mexico and the Caribbean; Brazil – Bahia and Espírito Santo (HOLTHUIS, 1974; TAKEDA, 1983; new occurrences).

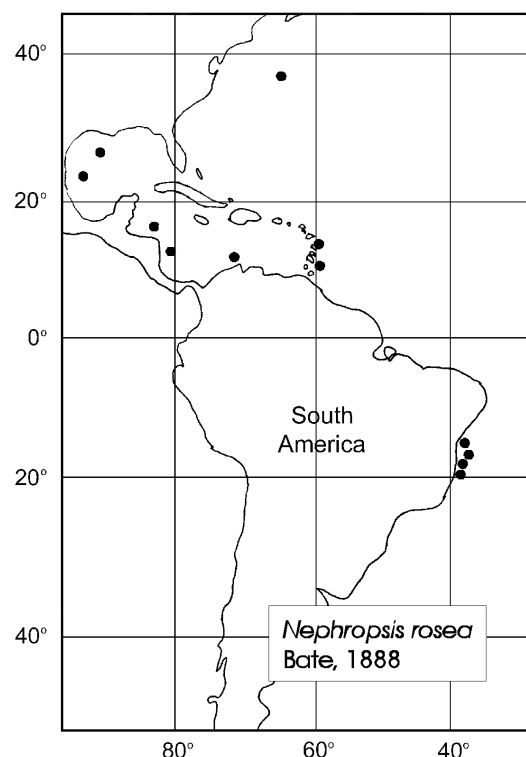


Fig.8- Geographic distribution of *Nephropsis rosea* Bate, 1888.

Acanthacaris Bate, 1888

Acanthacaris caeca (A. Milne Edwards, 1881)
(Fig.9)

Phoberus caecus A. Milne Edwards, 1881:1.

Acanthacaris caeca – HOLTHUIS, 1974:741, figs.4-8; 1991:5; MELO, 1999:478, fig.320; TAKEDA, 1983:85.

Material examined – Revizee Score-Central Program. E0510, 15°47.383'S, 38°36.154'W, 580-615m, 1♀ ovigerous (cl: 157.5mm), MNRJ 14226.

Diagnosis – Rostrum with four dorsal spines and seven ventral spines. Carapace with subdorsal carinae with one pair of spines and some spinules; with supraorbital carina, median carina and antennal carina. Abdominal pleurae with small anterior granules. Abdominal tergum without line or median carina. Uropod with exopod with a diaeresis.

Description – Rostrum slightly curved upward, laterally compressed, with four dorsal spines and seven ventral spines, and with granules on lateral margin. Median groove forming two lateral carinae with seven to eight spinules on each one, its length extending up to end of scaphocerite.

Antennae 1 with stilocerite and peduncle divided in three articles with biramous flagellum. Antennae 2

with peduncle and flagellum uniramous both longer than those ones of antennae 1; scaphocerite with spine on outer side and setose distal margin.

Carapace with spinules; supraorbital carina with one pair of strong supraorbital spines and posteriorly, five spines that diminish gradually. Subdorsal carinae with one pair of strong spines anteriorly and a row of spinules after each spine; median carina with one row of ten spinules until postcervical groove, and after it there is another row with eight spinules; antennal spine strong and posteriorly a spinule and a row of little spinules forming an antennal carina. Hepatic spine on middle of lateral surface of carapace, below hepatic groove, between cervical and postcervical grooves, and another branchiostegal small spine on anterior margin of carapace.

All maxillipeds with exopods and epipods. First three pairs of pereopods chelate, the other two ambulatorial. First pair of pereopods with both dactili similar, forming a large chela, both with small, medium and large teeth. Pereopods with granules and small spines. Carpus of second pair of pereopods with about 1/4 of length of merus. Chela of second pair of pereopods half or less than length of carpus. Palm of third pair of pereopods half of length of merus. Carpus of fourth and fifth pairs of pereopods with half or a little more than length of palm.

Abdomen with six pairs of pleopods, first one small in females and uniramous; other pleopods biramous. Endopod of uropod with a terminal spine, surface with small spines and granules. Exopod of uropod equal in size to endopod, but with a diaeresis. Tergum with granules and small spinules. Telson rectangular with small granules, spinules and spines on lateral surface. Pleurae ending in a sharp point, with setose anterior margin and spines on surface.

Remarks – HOLTHUIS (1974) and TAKEDA (1983) observed a variation in the number of dorsal spines on rostrum from none to three, but the single specimen examined here presented four dorsal spines.

The single specimen examined was an ovigerous female, collected in June 2000. It was also found ovigerous during June from off British Honduras and off Nicaragua (HOLTHUIS, 1974).

Acanthacaris caeca was recorded from Florida to Colombia (HOLTHUIS, 1974) and from Amapá, Brazil (MELO, 1999). The record of this species from Bahia (15°S) enlarges significantly its known meridional distribution (Fig.9).

Distribution – Gulf of Mexico to Caribbean Sea including the Straits of Florida, Brazil - Amapá and Bahia (HOLTHUIS, 1974; 1991; TAKEDA, 1983; MELO, 1999; new occurrences).

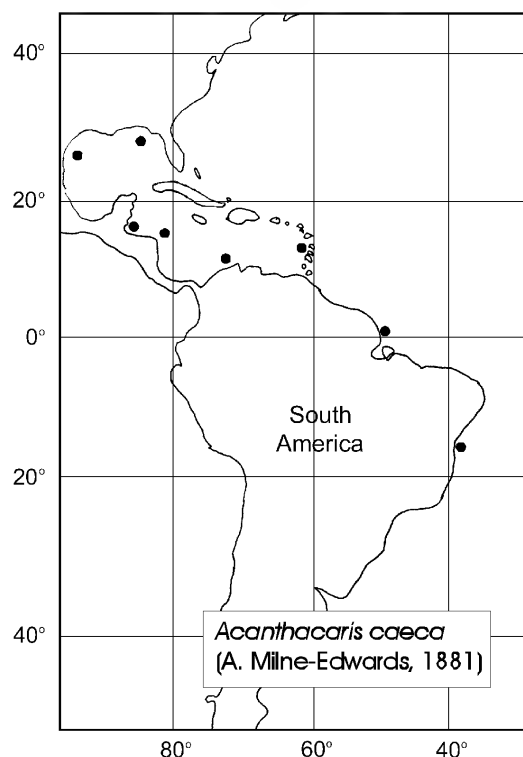


Fig.9- Geographic distribution of *Acanthacaris caeca* (A. Milne-Edwards, 1881).

DISCUSSION

The following discussion on the distribution of Nephropidae follows the general scheme of regions described by EKMAN (1953) and BRIGGS (1974) with additions for South America by YOUNG (1995).

The Atlantic fauna of Nephropidae is composed by 18 species distributed in 9 genera (HOLTHUIS, 1974; 1991; TAKEDA, 1983; MANNING, 1997). The Eastern and Western Atlantic does not have any species in common. Along the Eastern Atlantic only three species are known: *Homarus gammarus* (Linnaeus, 1758) and *Nephrops norvegicus* (Linnaeus, 1758) occurring in the Eastern Atlantic Boreal and Atlantic-Mediterranean regions; and *Nephropsis atlantica* Norman, 1882 which enlarges its distribution into the West African Region, south to Gabon. No species are known from the southern part of Africa.

The Western Atlantic presents 15 species, with 6 distinct patterns of distribution. *Homarus*

americanus H. Milne-Edwards, 1837, are found in the Western Atlantic Boreal Region. *Nephropides caribaeus* Manning, 1969, *Metanephrops binghami* (Boone, 1927), *Eunephrops bairdii* Smith, 1885, *E. cadenasi* Chace, 1939, *E. manningi* Holthuis, 1975 and, *E. luckhursti* Manning, 1997, are restricted to the Caribbean Region. The five species studied herein: *Acanthacaris caeca*, *Nephropsis aculeata*, *N. agassizi*, *N. neglecta* and *N. rosea* occur in the Caribbean and Brazilian regions, but in the last one they are restricted to the Tropical Brazilian Province. *Metanephrops rubellus* (Moreira, 1903) is found in the Subtropical Province of the Brazilian Region and in the Temperate Province of the Eastern South America Region. In this last province it is also found *Thymops birsteini* (Zarenkov & Semenov, 1972), which is also found in Falklands Is. Finally, *Thymopsis nilenta* Holthuis, 1975 are restricted to the Sub-Antarctic Islands of Falklands and South Sandwich Is.

Therefore, the Caribbean Region is the richest in species of Nephropidae (11) in the Atlantic, followed by the Brazilian Region with 6 species.

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ABSTRACT

The Revizee Score-Central Program sampled five species of Nephropidae from Bahia, Espírito Santo and Rio de Janeiro states, Brazil: *Nephropsis aculeata* Smith, 1881, *N. agassizi* A. Milne Edwards,

1880, *N. neglecta* Holthuis, 1974, *N. rosea* Bate, 1888 and *Acanthacaris caeca* (A. Milne Edwards, 1881). *N. neglecta* and *N. rosea* are recorded for the first time from the Brazilian coast and *A. caeca* has its known meridional distribution greatly enlarged. The geographic distribution along the Atlantic ocean of the Nephropidae species is presented; the Caribbean Region zone has the greatest species richness followed by the Brazilian Region.

Key words: Decapoda, Nephropidae, Brazil, taxonomy, geographic distribution.

RESUMO

NEPHROPIDAE (CRUSTACEA, DECAPODA)

COLETADOS PELO PROGRAMA

REVIZEE SCORE-CENTRAL AO LARGO DOS ESTADOS DA BAHIA AO RIO DE JANEIRO, BRASIL

O Programa Revizee Score-Central amostrou cinco espécies de Nephropidae nos estados da Bahia, Espírito Santo e Rio de Janeiro, Brasil: *Nephropsis aculeata* Smith, 1881, *N. agassizi* A. Milne Edwards, 1880, *N. neglecta* Holthuis, 1974, *N. rosea* Bate, 1888 e *Acanthacaris caeca* (A. Milne Edwards, 1881). *N. neglecta* e *N. rosea* são pela primeira vez registradas para a costa do Brasil e *A. caeca* tem o conhecimento da sua distribuição meridional grandemente estendida. A distribuição geográfica das espécies de Nephropidae ao longo do oceano Atlântico é apresentada; a Região Caribeana tem a maior riqueza de espécies, seguida pela Região Brasileira.

Palavras-chave: Decapoda, Nephropidae, Brasil, taxonomia, distribuição geográfica.

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A REVIEW OF THE HEXACREUSIA SPECIES COMPLEX: EASTERN PACIFIC CORAL BARNACLES (CIRRIPEDIA, BALANOMORPHA)⁽¹⁾

(With 3 figures)

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Central American plate tectonics at the close of the Miocene (circa 5.5 Ma) severed the trans-isthmian seaway between the Caribbean-western Atlantic and eastern Pacific. Although the highly successful, coral-inhabiting, tethyan ceratoconchids were present in the eastern Pacific, for reasons likely related to paleotectonic and climatic changes they vanished by the late Miocene or early Pliocene (ROSS & NEWMAN, 1973). The open niche for coral barnacles was soon occupied by *Hexacreusia*, the first records for which appeared in late Pliocene sediments of northwestern Mexico (ZULLO, 1961; ROSS, 1962).

Hexacreusia durhami was described by ZULLO (1961) based on specimens collected from 13 localities bordering the Gulf of California, Mexico, of which two samples were of late Pliocene age, three Pleistocene and eight Recent. Subsequent collections extended its range to the Islas de Tres Marias, Mexico (ROSS, 1962), near the Golfo de Fonseca (ZULLO, 1967) and as far south as Panama (ZULLO, BEACH & CARLTON, 1972).

Although ROSS (1962) also described and illustrated *H. durhami*, he noted that the opercular morphology of certain specimens departed from those described earlier by Zullo. In view of this, and recognizing that taxonomic values have changed in recent times we decided to reexamine this species. Our evaluation suggests there are now two species present in the Gulf of California one of which we describe as a new species. Furthermore, we have taken the opportunity to reevaluate *Hexacreusia straeleni* (ZULLO & BEACH, 1973) from the Galapagos Islands and propose that it be placed in a new genus.

not cystose; opercular plates separable, balanoid; scutum lacking rostral tooth, adductor ridge traversing plate from rostral angle to articular ridge, presence of a ridge below the adductor ridge apically tangent to it; tergum with numerous well developed depressor muscle crests; living on scleractinian corals.

Type genus – *Hexacreusia* Zullo, 1961; by original monotypy (NEWMAN, 1996).

Remarks – NEWMAN (1996) proposed this subfamily, without comment, based on his correspondence with V.A.Zullo. Although he included *Hexacreusia* within the Pyrgomatidae we herewith formally assign it to the Archaeobalanidae for several reasons (see ROSS & NEWMAN, 1973), especially the fact that pyrgomatids chemically mediate their growth relationship with the host whereas *Hexacreusia* and the closely related archaeobalanids *Conopea* Say and *Armatobalanus* Hoek do not (ROSS & NEWMAN, 2000). In order to maintain the wall at the surface of the host coral, *Hexacreusia* must fracture the coral overgrowths at the junction between the wall and basis (ZULLO, 1961), and the same holds true for those species of *Armatobalanus* that settle on scleractinian corals (ROSS & NEWMAN, 2000).

ZULLO (1961) and ZULLO & BEACH (1973) referred to a structure on the internal surface of the scutum for which they coined the term “adductor shelf,” but it is merely the adductor ridge because it supports the adductor muscle depression. What is of interest here is the presence of a ridge that is below, and apically tangent to the adductor ridge and is unique to the hexacreusiines. The functional significance of this ridge remains unknown.

SYSTEMATICS

Family Archaeobalanidae Newman & Ross, 1976

Subfamily Hexacreusiinae Newman, 1996

Definition – Wall six-plated (R-CL¹-CL²-C), ribbed, non-tubiferous; radii broad, transparietal; basis

Genus *Hexacreusia* Zullo, 1961

Hexacreusia Zullo, 1961:73.

Definition – Wall patelliform, relatively thick; scutum equal to or wider than high, externally sulcate; spur of tergum not confluent with scutal margin.

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Type species – *Balanus (Hexacreusia) durhami* Zullo, 1961; by original monotypy.

Hexacreusia durhami (Zullo, 1961)
(Fig.1)

Balanus (Hexacreusia) durhami Zullo, 1961:73, fig.1, pl.17, figs.1-8; ZULLO, 1967:126 (Panamic Province).

Balanus durhami – ROSS, 1962:27, in part, figs.21-22 only (Gulf of California to Tres Marias Is., Mexico; Pliocene to Recent); ROSS & NEWMAN, 1973:148 (footnote).

Hexacreusia durhami – ZULLO, BEACH & CARLTON, 1972:72 (Bahia Honda, Veragua and Las Secas Is., Golfo de Chiriqui, Panama).

Armatobalanus durhami – ROSS & NEWMAN, 1973:148 (taxonomic assignment); JOHNSON & LEDESMA-VAZQUEZ, 1999:573 (Bahía San Antonio, Baja California Sur, Mexico, Pleistocene).

Diagnosis – Basal margin of scutum entire; articular ridge shorter than tergal margin; lateral depressor muscle depression large, deep.

Type locality – Recent, Coyote Bay, Baja California, Mexico (26°12'N, 111°12'W); J.W.Durham coll., Nov. 19, 1940; on *Porites californica* Verril, 1901.

Remarks – ZULLO (1961) based his description of this species on fossil and extant specimens collected

from 13 localities bordering the Gulf of California, Mexico. ROSS (1962) added numerous Pliocene to Recent localities, and JOHNSON & LEDESMA-VÁZQUEZ (1999) added one Pleistocene locality (see Fig.3). In the synonymy above we have listed all of the records in the literature that compliment the original description. However, in lieu of descriptions or illustrations of many of these specimens some may not apply to this species, but rather to the new species described below.

ZULLO (1961) provided a lengthy and thorough description of this species, supplemented by that of ROSS (1962) to which we can not add any relevant information. The morphological features of this species are compared with that of the new species below, based almost wholly on opercular morphology inasmuch as there are no major defining characters in the wall.

Hexacreusia puritanae sp.nov.
(Fig.2)

Balanus durhami – ROSS, 1962:27, in part, figs.18-20 only.

Diagnosis – Basal margin of scutum strongly sinuous, deeply hollowed out at basi-tergal angle; articular ridge same length as tergal margin; lateral depressor muscle depression marginal, small, shallow.

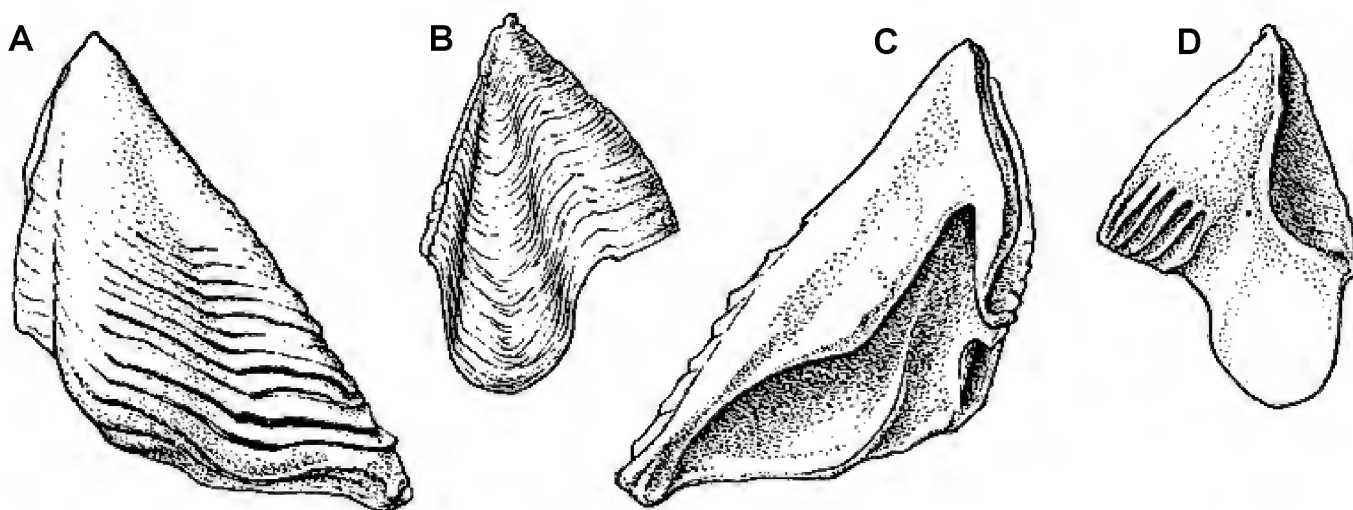


Fig.1- *Hexacreusia durhami* (Zullo, 1961): (A) external view of left scutum; (B) external view of right tergum; (C) internal view of left scutum; (D) internal view of right tergum. After ZULLO (1961); all figures x31.

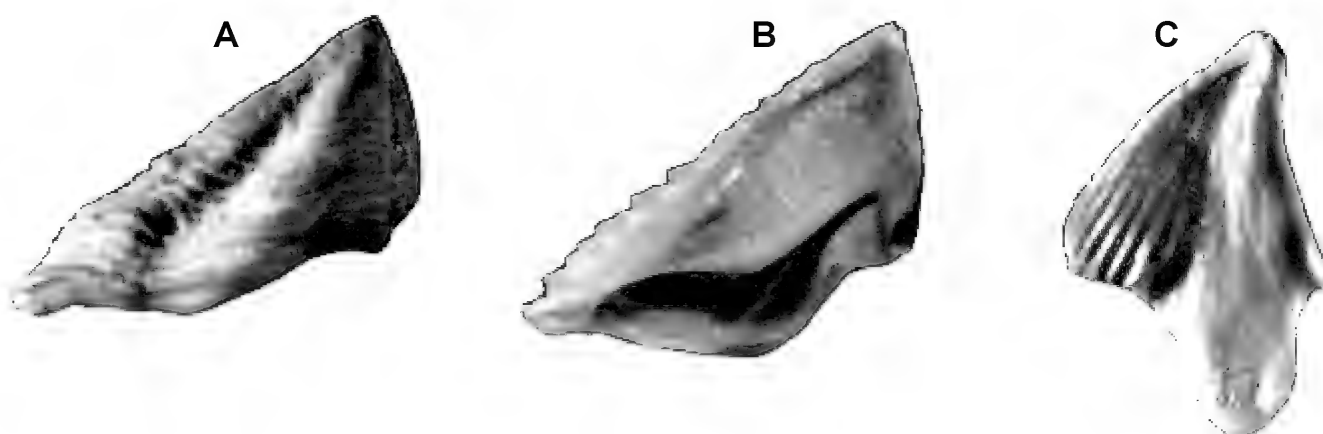


Fig.2- *Hexacreusia puritanae* sp.nov.: (A) external view of right scutum; (B) internal view of right tergum; (C) internal view of left scutum. Holotype, American Museum of Natural History no. 11863. After ROSS (1962); all figures x34.

Description – Height of scutum equal to width; apical angle about 76° ; articular ridge long, extending complete length of tergal margin; articular furrow shallow, narrow; adductor ridge extending medially from rostral angle, gradually changing direction about one-half distance from rostral angle before ascending to articular ridge, terminating at mid height of plate; adductor and lateral depressor muscle depressions poorly defined. Tergum appearing moderately narrow; rostral margin gradually sloping, same length as scutal margin; length of spur slightly greater than width; articular furrow narrow, shallow; tergal crests long, thin.

Type-locality – Recent, Southeastern end of San Esteban Is., Gulf of California, Mexico ($28^\circ 41' 15''\text{N}$, $112^\circ 34'\text{W}$) (Fig.3); 0-6.4m; 16.6°C ; May 18, 1957; on *Porites californica* Verrill, 1901. Holotype: American Museum of Natural History no. 11863.

Etymology – Named for the schooner “Puritan” whose scientific party collected this species (see EMERSON, 1958).

Remarks – The following features of *H. durhami* serve to distinguish it from *H. puritanae*. The scutum is significantly wider than high, the terminus of the adductor ridge is about one-third the distance from the apex of the plate, there is a decided angle in the adductor ridge about two-thirds the distance from the rostral angle before ascending to the articular ridge which is shorter than the tergal margin, the articular furrow is broad and deep, and the articular furrow of the tergum is also broad and deep. In addition, the apical angle of the scutum is about 65° whereas it is about 76° in *H. puritanae*.

Zulloana gen. nov.

Definition – Wall high conic to globular, relatively thin; scutum higher than wide, externally non-sulcate; spur of tergum confluent with scutal margin.

Type-species – *Hexacreusia straeleni* Zullo & Beach, 1973.

Etymology – This genus is named for the late Victor A. Zullo, in appreciation of his studies on the Galapagan cirriped fauna.

Remarks – The shape of the wall and heterogonic growth form of this species much like that of *Megatrema anglica* (Sowerby, 1823) clearly sets it apart from the two species of *Hexacreusia*. In having settled on the edge of the calyx it develops a largely free standing deep cup-shaped basis that extends up and outward from the host coral. The major feature that unites *Hexacreusia* and *Zulloana* under the Hexacreusiinae is the unusual development of the adductor ridge and in the main this is where the similarity stops.

Zulloana straeleni (Zullo & Beach, 1973)

Hexacreusia straeleni Zullo & Beach, 1973:11, figs.24-34 (shell and appendages).

Diagnosis – Internal surface of opercular plates rugose; basal margin of adductor ridge sinuous; adductor muscle depression small, deep.

Type locality – Recent, Beagle I., Galapagos Is. ($0^\circ 25'\text{S}$, $90^\circ 37'\text{W}$); Fritz and Carmen Angermeyer colls., on a solitary coral, 55-90m.

Remarks – Inasmuch as this is the only species assigned to the genus we can offer no further comments. Noteworthy, the apical angle of the scutum is only 45°.

DISCUSSION

The distribution of *H. durhami* was originally considered to be within the Golfo de California (ZULLO, 1961), but ROSS (1962) extended it south

to the Islas de Tres Marias. ZULLO (1967) subsequently reported it from near the Golfo de Fonseca, and ZULLO, BEACH & CARLTON (1972) from Panama which falls within the northern portion of the Panamic Faunal Province. What is of interest here is that the Panamic Province is separated from the Golfo de California by some 3000km of largely coral-reef free areas, thus suggesting that there may be a third south-ranging species of *Hexacreusia*.

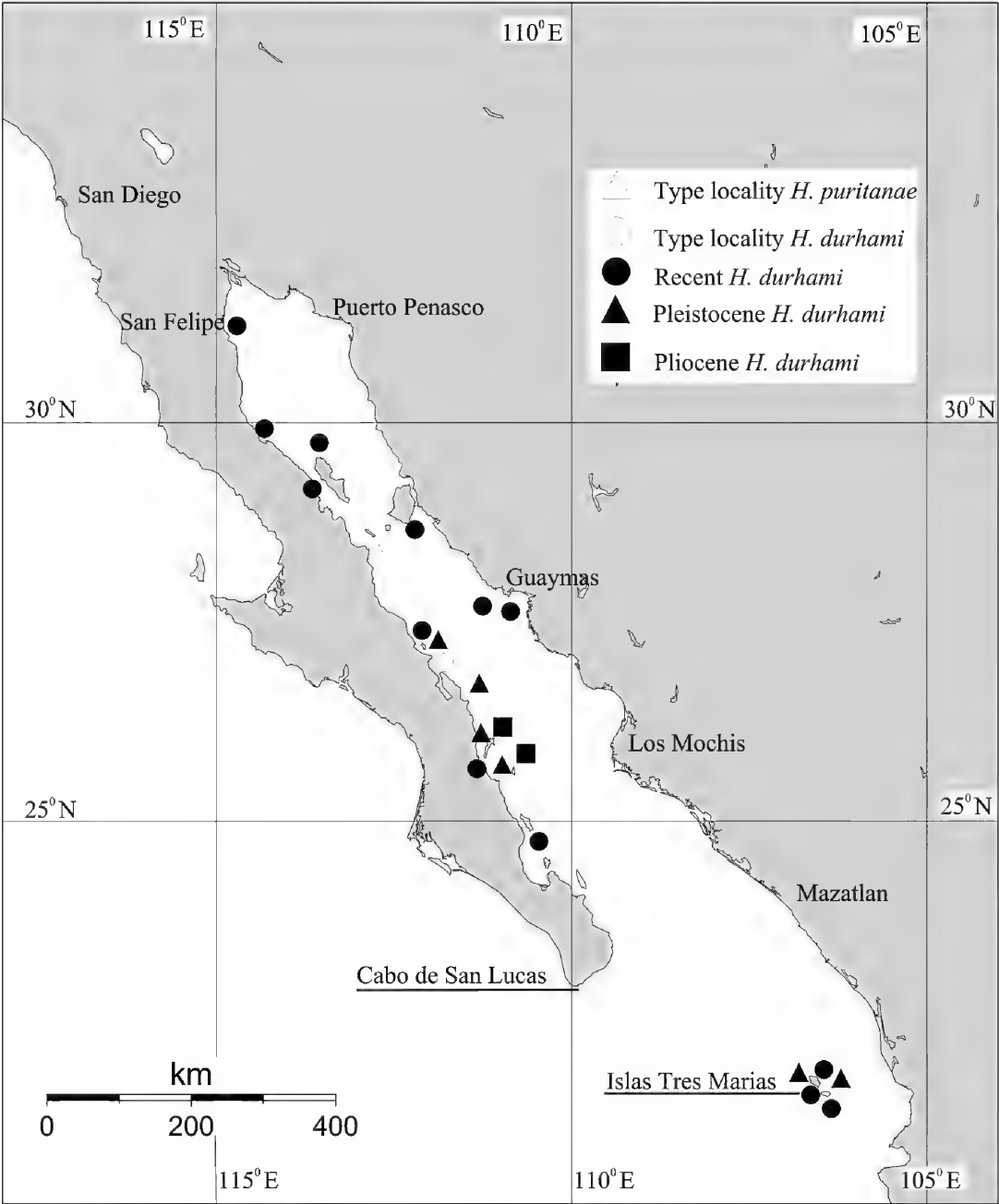


Fig.3- Distribution of *Hexacreusia* in northwestern Mexico. Other records include the region near the Golfo de Fonseca and Panama (ZULLO, BEACH & CARLTON, 1972). *Hexacreusia puritanae* sp.nov. is known only from Islas San Esteban Island. Locality records are based on ZULLO (1961), ROSS (1962) and JOHNSON & LEDESMA-VÁZQUEZ (1999). Those locality records by Zullo that are duplicated by Ross are not shown.

The Galapagos Archipelago, nearly 1000km off the coast of Ecuador, is the only region where *Zulloana* has been found. ZULLO & BEACH (1973) apparently examined corals from Cocos Island, some 400km off the coast of Costa Rica and Clipperton Atoll, some 1100km off the coast of Central America and failed to find either *Z. straeleni* or another species. Although there are numerous other oceanic islands in the Eastern Pacific, both closer and farther from the mainland, it seems questionable whether other species of this genus will be found.

Because there are no known hexacreusiines in the Caribbean-Western Atlantic, and the earliest record for their appearance is the late Pliocene of Baja California, well after closure of the transisthmian seaway separating South and Central America, it seems reasonable to interpret their origin as having been in the Eastern Pacific. *Hexacreusia* has long been considered to have been derived from an *Armatobalanus*-like ancestor (ZULLO, 1961; ROSS & NEWMAN, 1973). Although a specious assumption, it is predicated on the fact that armatobalanids are known to be: 1) obligate symbionts of scleractinian corals, 2) they must fracture the overgrowths between the wall and basis as well as between the compartment ribs to maintain their growth regimen, and 3) the cirri are armed with strong teeth that are capable of keeping the orifice clear of coral tissue. Nonetheless, there is only one species in the Eastern Pacific, living on stylasterine corals (ZULLO, 1963), but it bears little resemblance to either *Hexacreusia* or *Zulloana* as do the numerous armatobalanids in the Indo-west Pacific where they reach their greatest diversity.

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RESUMO

REVISÃO DO COMPLEXO DE ESPÉCIES *HEXACREUSIA*:
CIRRIPÉDIOS EPIBIONTES DE CORAL DO PACÍFICO LESTE
(CIRRIPEDIA, BALANOMORPHA)

Hexacreusia Zullo, 1961, é aqui formalmente transferida de Pyrgomatidae para Archaeobalanidae. O exame de alguns espécimens de *Hexacreusia*, da Ilha de San Estaban localizada no Golfo da

Califórnia, México, revelou a existência de uma segunda espécie em adição a *H. durhami* Zullo, 1961, sendo proposta *H. puritanae* sp.nov. A espécie *Hexacreusia straeleni* Zullo & Beach, 1973, encontrada no arquipélago de Galápagos, difere em relação a forma, padrão de crescimento e hospedeiro, das formas continentais de *Hexacreusia* e é colocada em *Zulloana* gen.nov.

Palavras-chave: Archaeobalanidae, *Zulloana* gen.nov., *Hexacreusia puritanae* sp.nov.

ABSTRACT

Hexacreusia Zullo, 1961, previously assigned to the Pyrgomatidae is herein formally reassigned to the Archaeobalanidae. Re-examination of certain specimens of *Hexacreusia* from San Esteban Island within the Gulf of California, Mexico has revealed that in addition to *H. durhami* Zullo, 1961 there is a second species present, for which we propose *H. puritanae* sp.nov. The Galapagan species, *H. straeleni* Zullo & Beach, 1973, differs in general form, manner of growth and type of host from the mainland forms of *Hexacreusia* and is assigned to a new genus, *Zulloana*.

Key words: Archaeobalanidae, *Zulloana* gen.nov., *Hexacreusia puritanae* sp.nov.

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A REASSIGNMENT OF *SCILLAELEPAS RHABDOTA* YOUNG, 1999
TO *AURIVILLIAELEPAS RHABDOTA* (CIRRIPEDIA, THORACICA)

(With 5 figures)

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Museu Nacional
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YOUNG (1999) based *Scillaelepas rhabdota* on disarticulated plates dredged from 944-945m near Trindade Island (20°43'S, 31°56'W). This species was based only on the scuta, terga and one rostrum. In light of the lack of a median groove on the rostrum, which suggested the absence of a subrostrum, Young included this species in the genus *Scillaelepas* s.s. However, with the finding of two entire specimens of this species from off São Sebastião, São Paulo, Brazil, a detailed description is possible, which is presented below.

Aurivilliaelepas rhabdota (Young, 1999)
(Figs.1-5)

Scillaelepas rhabdota Young, 1999: 613, fig.3a-h.

Material – Brazil, Calypso col. – Sta. SME 1776, 25/Jan/1962, 24°54,4'S, 44°26,0'W, 1000m, off São Sebastião, São Paulo, Brazil, mud bottom and a scleractinian coral (*Solenosmilia variabilis* Duncan, 1876), 2 specimens, MNHN Paris Ci 1792.

Diagnosis – Plates with strong radial striae forming beaded surface. Scutum length 1.5 times its width, apex curving toward tergum. Carina slightly arched, projecting upwards. Rostro-latus with carinal portion touching carinal-latus below L; apex strongly incurved with an angle of 90°. Mandible with three teeth, plus bifid inferior angle having its upper margin denticulate.

Description – Hermaphrodite. Capitulum (Fig.1a) of 14 approximate plates, thick cuticle exposed only at base of plates; length a little greater than width; carinal margin slightly convex, occludent margin convex. Plates with thick, numerous fine growth lines intercalated by spaced, strong growth lines, and strong radial striae, forming a beaded surface. Scutum (Fig.1a) triangular, length 1.5 times its width; with strong medial ridge separating surface into two nearly flat surfaces; occludent margin convex, tergal margin concave, basal margins forming angle at tip of medial ridge; apex curving toward tergum.

Tergum (Fig.1a) kite-shaped; a large, flat medial ridge divides plate into two similar flat surfaces of equal area; apex straight; occludent and carinal margins straight, surface area similar to that of scutum.

Carina (Figs.1a, b) slightly arched, with tectum divided into two large, flat laterals areas; basal margin v-shaped; umbo apical; apex projecting upwards, extending beyond capitulum outline at mid-point of carinal margin of tergum.

Median-latus (L) (Fig.1a) situated in the lower whorl; triangular, asymmetrical, wider than high, with a deep groove medially, to receives the rostral tip of carinal-latus; apex strongly incurved and slightly curved backwards, situated over base of tergum; rostral margin two times length of carinal margin.

Rostrum (Figs.1a, c) large; height about 1/3 length of scutum; projected, and slightly curved toward scuta; surface nearly convex with two shallow grooves, which receives the lateral tip of sub-rostrum.

Rostro-latus (Fig.1a) triangular, symmetrical, wider than high, surface uniformly concave; carinal portion touching carinal-latus below L; apex strongly incurved with an angle of 90°.

Carino-latus (Fig.1a) triangular, wider than high; surface with a deep lateral groove to receives lateral tip of subcarina, and with a shallower groove to receives carinal tip of rostral-latus; apex incurved and turned toward rostrum.

Sub-carina (Fig.1b) triangular, equilateral, as wide as high; apex slightly curved toward carina; surface uniformly convex.

Subrostrum (Fig.1c) triangular, wide at base, curving evenly, with a strong medial ridge and two grooves which receive rostral tips of rostral-latera.

Peduncle (Fig.1a) short, about one-half length of capitulum; covered by imbricating peduncular plates (approximately 12 in each whorl) with a thick cuticle between them; peduncular plates situated basally triangular, those near the capitulum usually with upper margin rounded, sometimes pointed.

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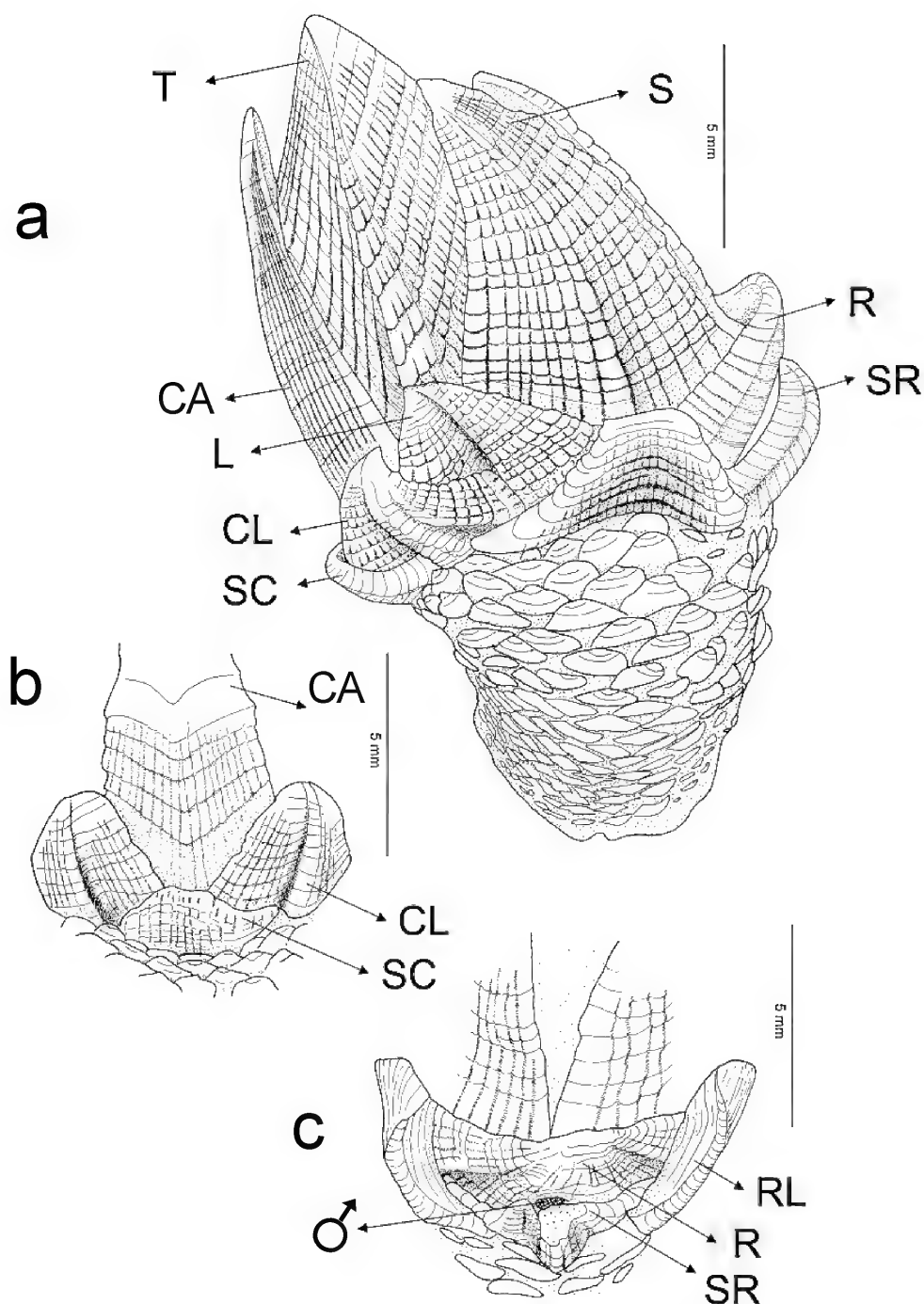


Fig.1- *Aurivillialepas rhabdota* (Young, 1999): (a) left lateral view, (b) carinal view, (c) rostral view. (CA) carina; (CL) carinolatus; (L) median-latus; (R) rostrum; (RL) rostro-latus; (S) scutum; (SC) subcarina; (SR) subrostrum; (T) tergum.

Prosoma (Fig.2a) with one protuberance at base of cirrus II, one blunt protuberance at middle dorsal portion, and one pair of short filamentary appendages anteriorly.

Labrum (Fig.2b) bullate, crest with few teeth, about 8 teeth on lateral surfaces. Palp (Fig.2c) small, paddle-like, several finely pinnate setae along inner and distal margins. Mandible (Fig.2d) with three

teeth, plus bifid inferior angle with denticulate upper margin; distance between first and second tooth almost same as between second and third. Maxillae I (Figs.2e, f) asymmetrical, both with cutting edge irregular in outline, but with lower portion protuberant; upper portion with one or two large, strong setae followed by several small and median spines below. Maxilla II (Fig.2g) slightly bilobed, with

finely pinnate, long setae along margins, except in notch; papilla of maxillary gland not projecting. Cirrus I (Figs.2a, 3a) not situated far from cirrus II, anterior ramus about 0.8 length of posterior ramus; articles clothed with numerous, simple and finely pinnate setae. Cirri II-VI (Fig.3b) with equal rami; intermediate articles of cirrus VI (Fig.3c) about twice as long as wide, armed with 5 pairs of setae, the

longest pair finely pinnate, setulae at the base of long setae; 3-4 long setae simple or finely pinnate on posterior angle. Setal-article ratio about 3:1. Caudal appendage (Fig.3d) uniarticulate, a little shorter than coxopodite of cirrus VI, with few simple setae at apex. Penis (Fig.3d) long, distal portion clothed by thin setulae. Number of articles of cirri I-VI is presented in table 1.

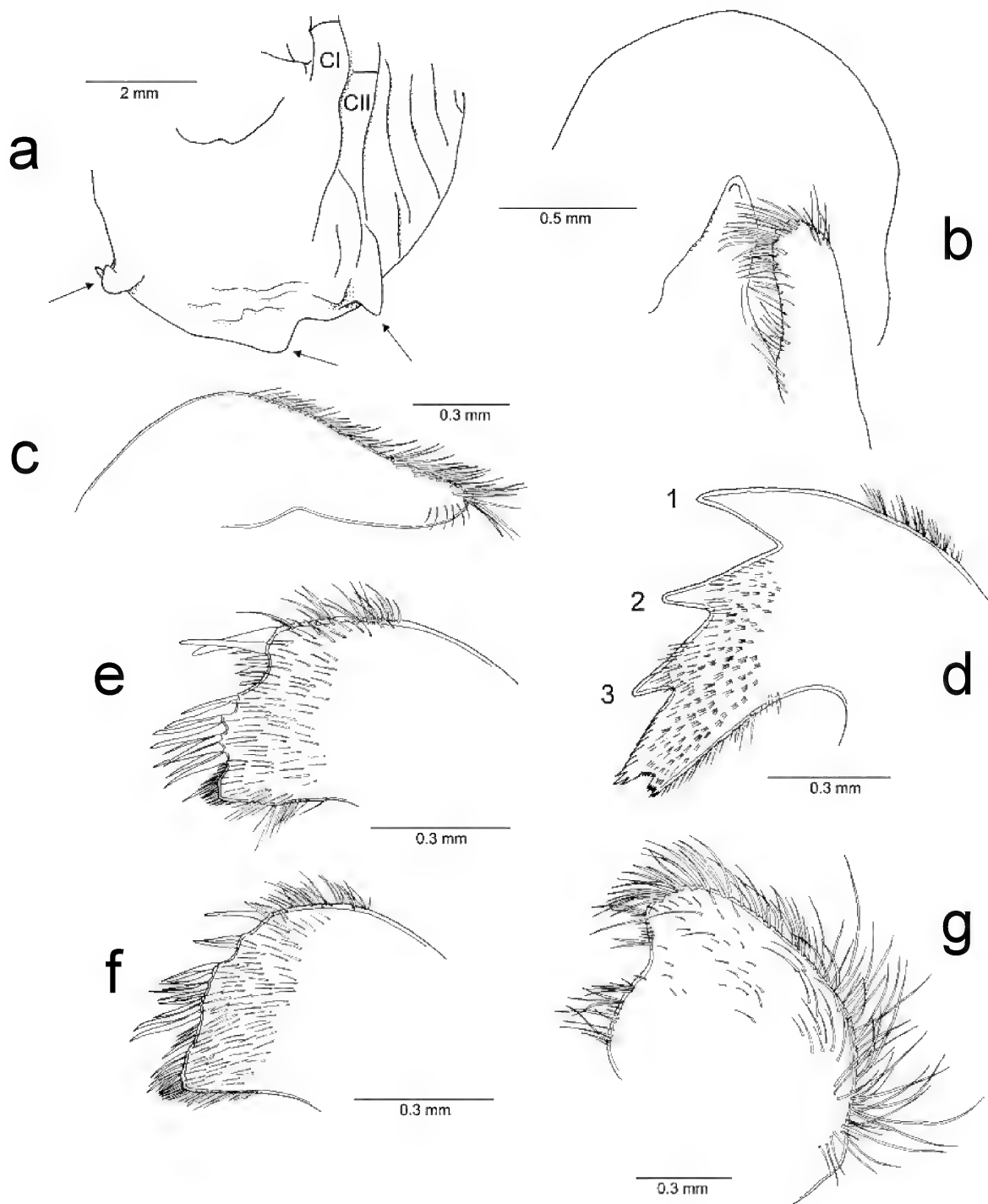


Fig.2- *Aurivillialepas rhabdota* (Young, 1999): (a) prosoma, arrows indicate the protuberances; (b) labrum and palp, (c) palp, (d) mandible, (e-f) maxillae I, (g) maxilla II. (CI) cirrus I; (CII) cirrus II.

TABLE 1

Number of articles for rami of cirri I-VI, and caudal appendages of *Aurivillialepas rhabdota* (Young, 1999)

	CI	CII	CIII	CIV	CV	CVI
RC	10/11	14/13	15/16	16/15	18/18	17/18
LC	9/11	16/17	16/14	18/18	18/16	16/16

(CI-VI) cirri I to VI; (RC) right cirri; (LC) left cirri

The smaller specimen (Fig.4a) is similar morphologically to that described above, except that the subrostrum is not fully developed, and it has a fewer number of plates in each row of peduncle (eight in each row).

One dwarf-male (Fig.4b) attached to the upper surface of the subrostrum. Capitulum with 8 plates: R, S, T, L, C. Tergum elongated with a notch on distal portion of scutal margin. Scutum triangular. Rostrum, L and carina triangular, much higher than wide. Peduncle nude.

Remarks – YOUNG (1999) assigned this species to *Scillaelepas* because of the absence of a medial groove or grooves in the rostrum. But, what he considered to be a rostrum was actually a subrostrum. In the adult specimen described here, the rostrum, subrostrum and a complementary male he taken with are present. Therefore, this species has to be reassigned to *Aurivillialepas*, viz, the genus that includes species with one subrostrum.

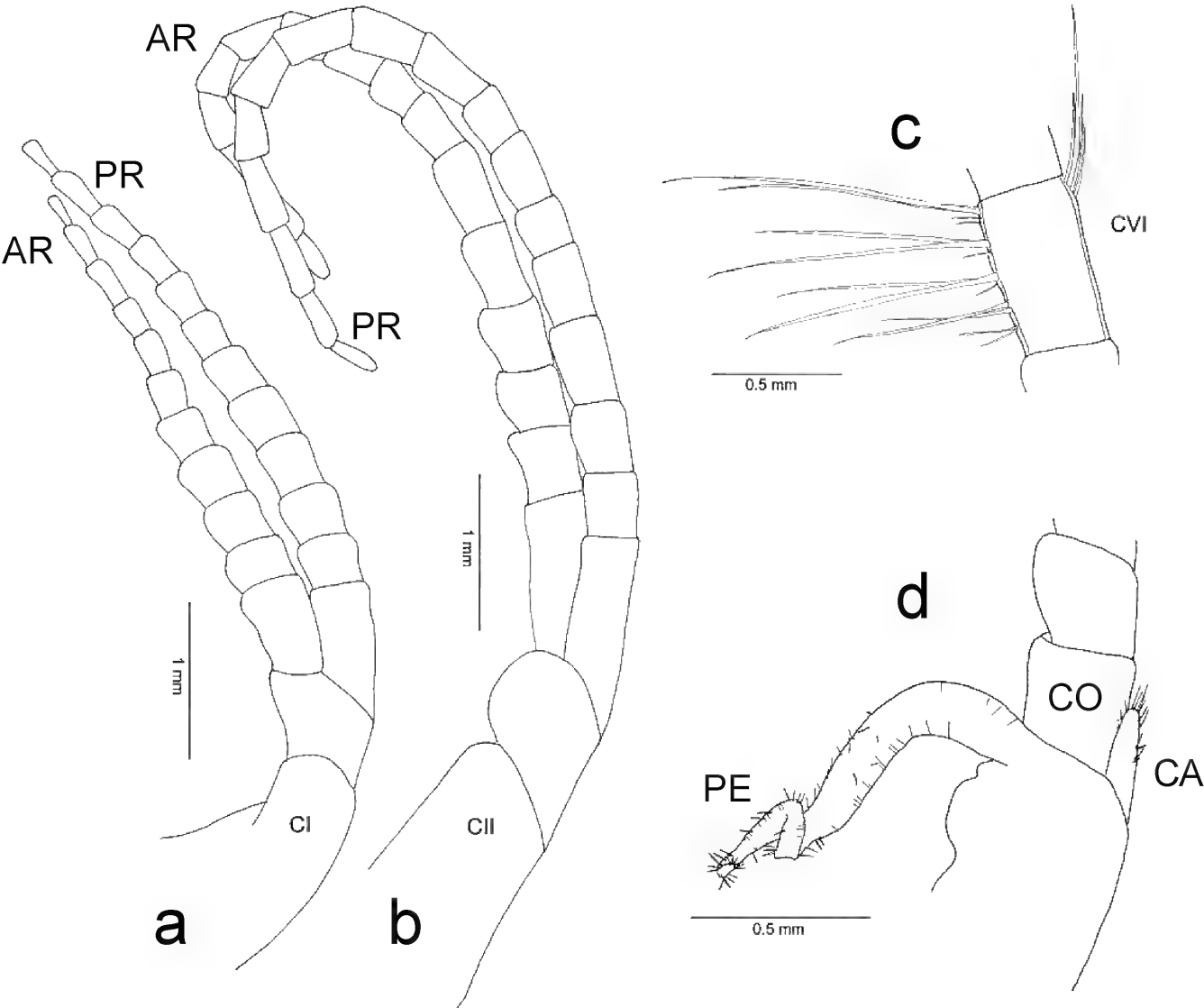


Fig.3- *Aurivillialepas rhabdota* (Young, 1999): (a) cirrus I, (b) cirrus II, (c) median article of cirrus VI, (d) protopodite of cirrus VI, caudal appendage and penis. (CI) cirrus I; (CII) cirrus II; (CVI) cirrus VI; (AR) anterior ramus; (CA) caudal appendage; (CO) coxopodite; (PE) penis; (PR) posterior ramus.

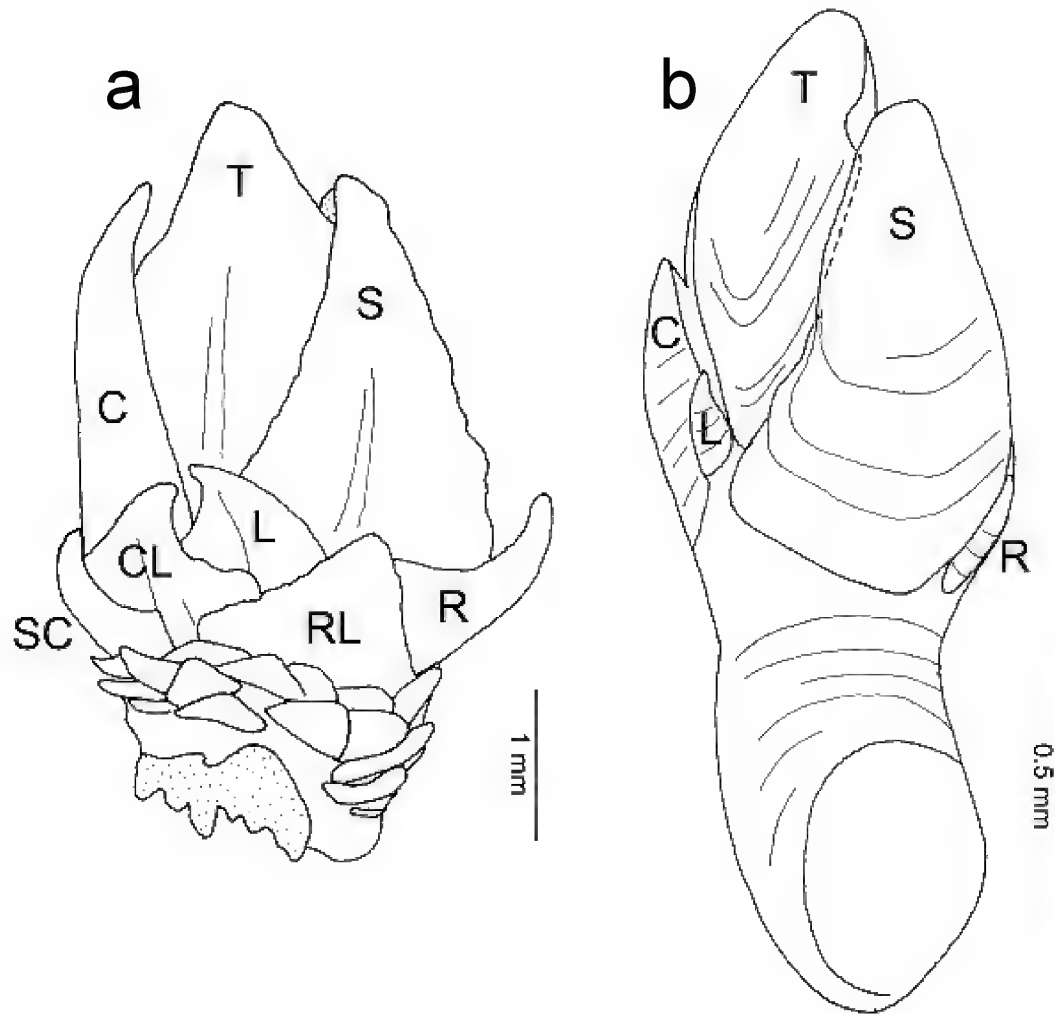


Fig. 4- *Aurivillialepas rhabdota* (Young, 1999): (a) smaller specimen; (b) complementary male. (C) carina; (CL) carino-latus; (L) median-latus; (R) rostrum; (RL) rostro-latus; (S) scutum; (SC) subcarina; (T) tergum.

All the characters observed by YOUNG (1999) agree with most of these new observations; except that the medial ridge of the scutum is only a little broader basally rather than broader basally, and the tergum has conspicuous radial ridges on the whole surface of plate and not just near the medial ridge. The width of the medial ridge of the scutum appears to be somewhat variable, but the absence of the radial ridges on the tergum was probably due to the corrosion of the disarticulated plates.

The lack of a projected maxillary gland papillae in *A. rhabdota* is puzzling since others *Scillaelepas* s.l. have them developed, but it may be due to a dissection artifact, when both maxillae II are separated.

The young specimen of *Aurivillialepas rhabdota* has yet to develop a subrostrum and therefore this may be confused with a *Scillaelepas*. But all the other plates are identical to the full grown specimen.

Four species of *Aurivillialepas* were previously known: *A. calyculus* (Aurivillius, 1898), *A. falcata* (Aurivillius, 1898); *A. arnaudi* (Newman, 1980), and *A. bocquetiae* (Newman, 1980).

Aurivillialepas bocquetiae and *A. falcata* have the rostral-latus and carino-latus far apart from each other, not touching below the L, while in *A. arnaudi*, *A. calyculus* and *A. rhabdota* the rostro-latus is wide, with its carinal portion overlapping the carino-latus, which has a longitudinal groove to receives its carinal angle. *Aurivillialepas arnaudi* has an rostro-latus acute, with the apical angle between 60 and 70°, instead of a 90° as observed in *A. calyculus* and *A. rhabdota*.

Aurivillialepas calyculus and *A. rhabdota* are very similar but the former has the carina more curved, following the capitulum in outline, the scutum almost as high as wide, with the apex but slightly

curved toward the tergum, and the mandible has a less bifurcate inferior angle; while *A. rhabdota* has the carina slightly curved, with its apex projecting from the capitular outline, the scutum is about 1.5 times higher than wide, and its apex is strongly curved toward the tergum, and the mandible has a more pronounced bifid inferior angle.

Aurivillialepas calyculus and *A. rhabdota* also have distinct dwarf-males: those from *A. calyculus* (NEWMAN, 1980: fig. 5d-e) have the carina almost as long as the tergum, the L is wider than high, the rostrum is half the length of scutum, whereas the one from *A. rhabdota* has the carina half the length of the tergum, the L is two times higher than wide,

and the rostrum is $\frac{1}{4}$ the length of the scutum.

Aurivillialepas calyculus, *A. falcata* and *A. bocquetae* are recorded from the Northeastern Atlantic (AURIVILLIUS, 1898; BOCQUET-VEDRINE, 1971; NEWMAN, 1980; YOUNG, 1998; 2001) while *A. arnaudi* is recorded from the Southwest Indian Ocean (NEWMAN, 1980; ZEVINA & SCHREIDER, 1992). *A. rhabdota* is the only species from the Southwestern Atlantic, therefore the genus *Aurivillialepas* has a distribution in the Atlantic and Indian oceans (Fig.5). However, the distribution in the Atlantic is discontinuous with *A. calyculus*, *A. falcata* and *A. bocquetae* limited to the northern hemisphere and *A. rhabdota* to the southern.

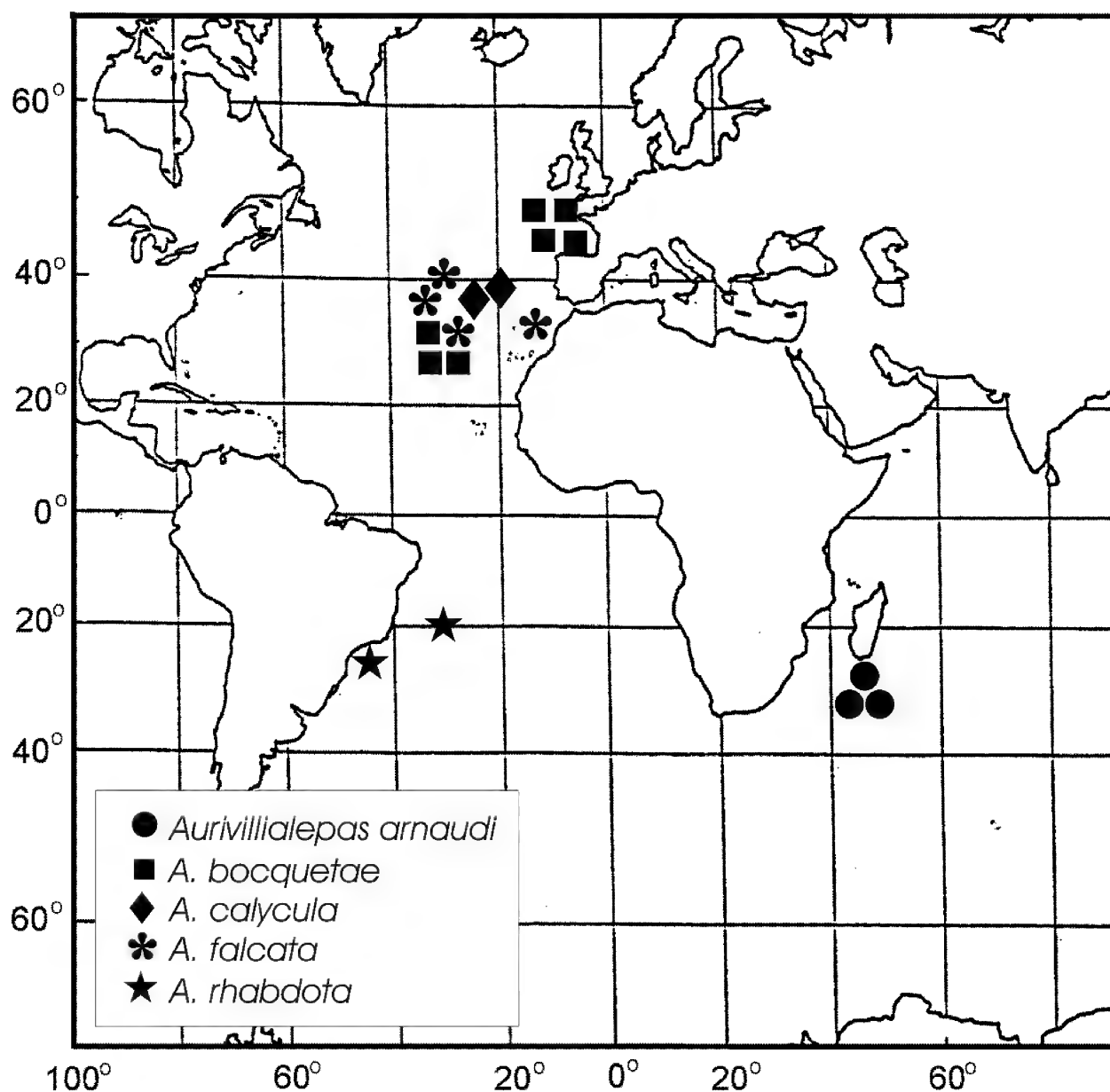


Fig.5- geographic distribution of the species of *Aurivillialepas*.

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RESUMO

REDESIGNAÇÃO DE *SCILLAELEPAS RHABDOTA* YOUNG, 1999
PARA *AURIVILLIALEPAS RHABDOTA*
(CIRRIPIEDIA, THORACICA)

Dois exemplares inteiros de *Scillaelepas rhabdota* foram recentemente encontrados na coleção realizada pelo Calypso em 1962. A espécie é redescrita, incluindo os apêndices e macho-anão, e transferida para o gênero *Aurivillialepas* por apresentar 14 placas capitulares.

Palavras-chave: Crustacea, Cirripedia, Scalpellomorpha, Brasil, mar profundo.

ABSTRACT

Two entire specimens of *Scillaelepas rhabdota* have recently discovered in the collections taken by the

Calypso in 1962 and the species is redescribed, including the appendages and dwarf male. It is transferred to the genus *Aurivillialepas*, because it has 14 capitular plates.

Key words: Crustacea, Cirripedia, Scalpellomorpha, Brazil, deep-sea.

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